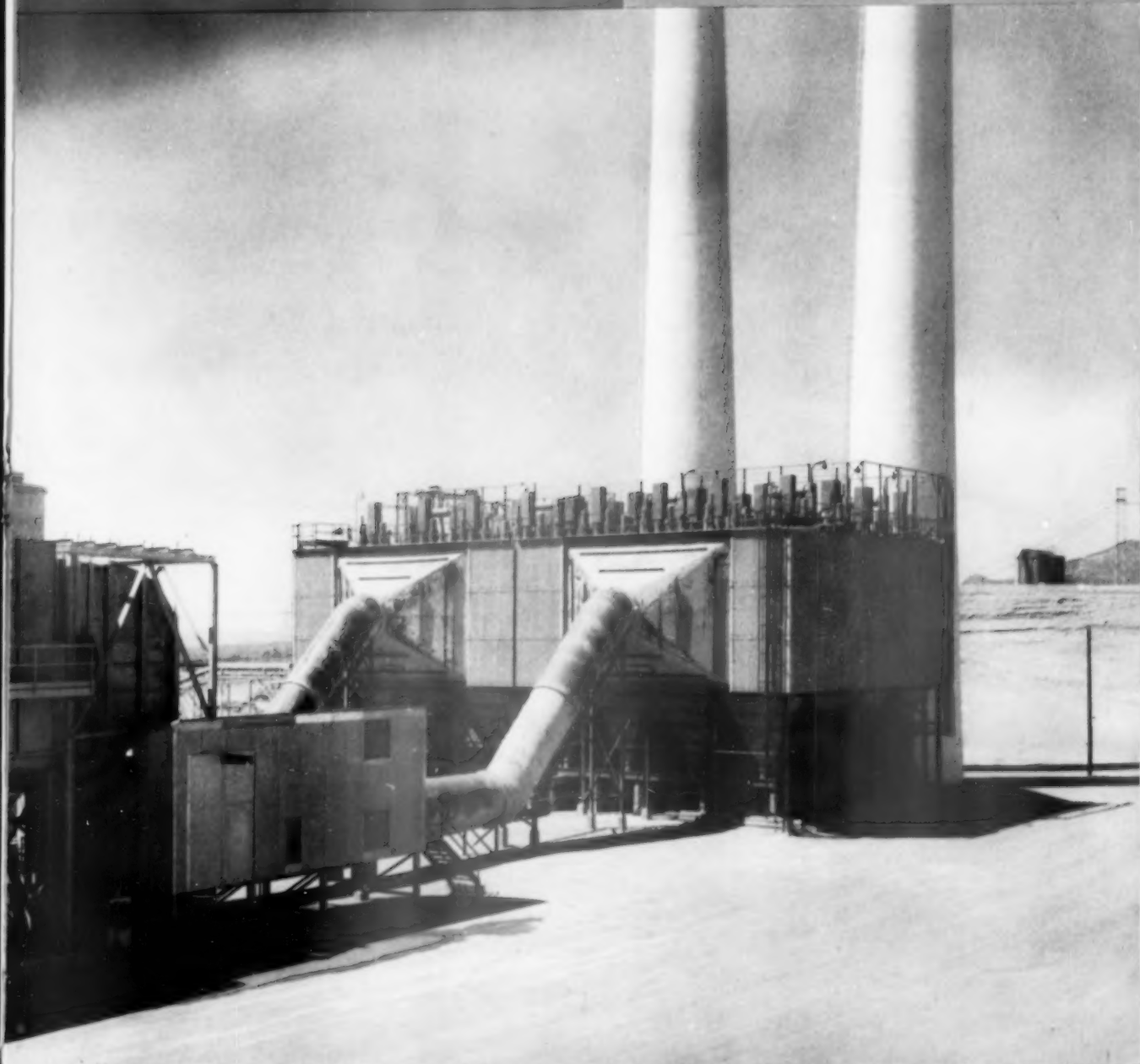


THE INDUSTRY'S RECOGNIZED AUTHORITY

# ROCK PRODUCTS

LARGEST PRODUCER CIRCULATION IN THE HISTORY OF THE FIELD

How Far Should  
Cement Industry Expand? page 74  
A Dust-free Cement Plant  
In the Middle of a Desert page 78  
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Dust precipitator installation at Mojave plant, California Portland Cement Co.

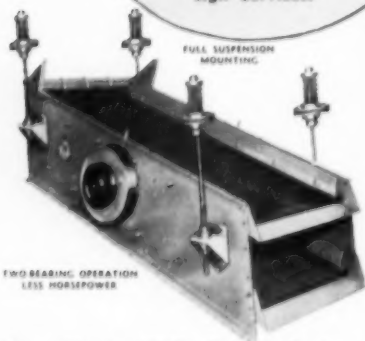
**ANNUAL CEMENT ISSUE**

**AUGUST 1956**

# DENVER CAN SUPPLY COMPLETE EQUIPMENT FOR YOUR MILL

One Responsibility

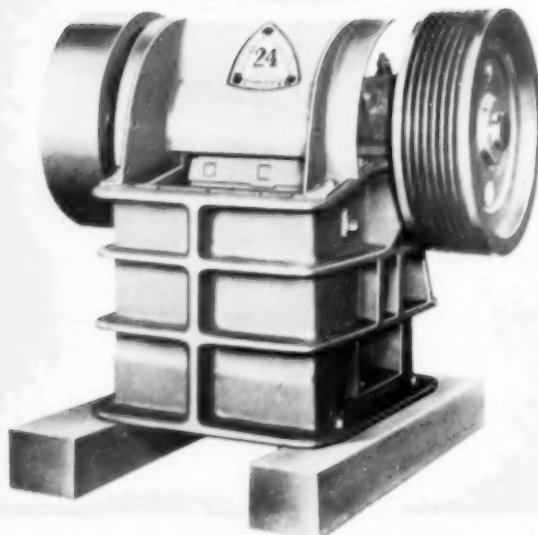
Agitators, Ball-Rod Mills, Classifiers, Conditioners, Crushers, Dryers, Feeders, Filters, Flotation, Jigs, Pumps, Samplers, Screens, Thickeners, Ore Testing and Mill Design Services.



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- Lower Power Cost with two-bearing operation and suspended assembly.
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For complete information, WRITE FOR BULLETIN NO. 53-B13.



## DENVER FORCED FEED JAW CRUSHERS

Assure Long Life in Heavy Duty Operation

### 1. ANTI-FRICTION BUMPER BEARINGS

Pitman bearing troubles—the most serious problem with bronze bearing crushers—have been eliminated by using oversize, heavy-duty roller bearings for the Pitmans on Denver type "H" Jaw Crushers. Prices are comparable to all-bronze-bearing crushers.

Two types of crushers are available—type "H" has anti-friction bumper bearings and bronze side bearings. Type "J" has anti-friction bearings for bumper and side bearings. Available in sizes 5" x 6" to 36" x 48".

### 2. LONG-LASTING JAW PLATES

Genuine 13-14% manganese cast steel is used for jaw and cheek plates on Denver Jaw Crushers. Jaw plates are reversible so that service life is greatly increased and replacement costs cut.

### 3. HIGH STRENGTH FRAME

The steel frame of Denver Jaw Crushers is heavily reinforced to withstand more than the most severe service it will meet in its size reduction range.

For complete information about Denver Jaw Crushers, WRITE FOR BULLETIN No. C12-B12.

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# B.F. Goodrich



## B. F. Goodrich conveyor belt doubles production, cuts costs 40%

*Nyfil fabrics give belts greater strength, yet cost no more*

**A**T this big Pennsylvania plant, limestone used to be hauled to the crusher in cars drawn by a locomotive. But the system was too slow and costly.

A conveyor belt was considered. But the company was afraid that the heavy boulders crashing down on it would break the fabric reinforcement, would soon wear out the belt.

They talked it over with B. F. Goodrich engineers, who convinced them that there was a B. F. Goodrich belt that could take this abuse. The belt they recommended is made of B. F. Goodrich Nyfil fabric, so named be-

cause nylon is used as cross threads in the fabric to give extra strength without adding weight. B. F. Goodrich belts made with Nyfil are much stronger and so have greater impact resistance and hold fasteners better than belts made with cotton fabric.

The B. F. Goodrich belt, with Nyfil fabric, had been in use 18 months when the picture was taken, needed no maintenance, looks as if it would last five years more. It has increased production 100%, cut costs 40%, released four men badly needed for other work.

B. F. Goodrich belts, made with

nylon-filled fabrics, have been in use many years now and are doing conveying jobs that were once considered impossible. Have your B. F. Goodrich distributor tell you *all* the advantages of belts made with Nyfil, or write B. F. Goodrich Industrial Products Company, Dept. M-679, Akron 18, Ohio.

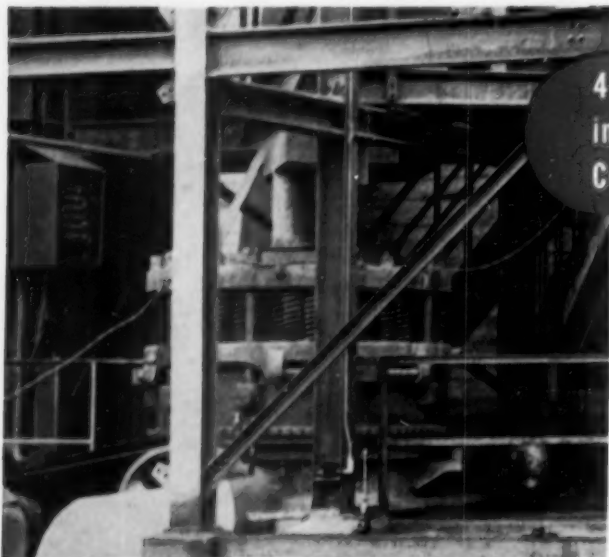
**B.F. Goodrich**

**INDUSTRIAL PRODUCTS**

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# TELSMITH

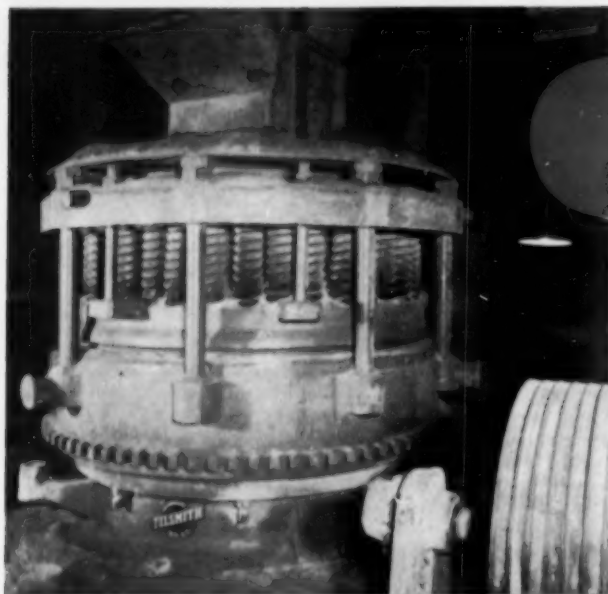
## *Gyraspheres* in CEMENT MILLS



48-FC Telsmith Fine Crushing Gyrasphere in the British Columbia Portland Cement Company Limited plant at Victoria, B. C.

The British Columbia Portland Cement Company Limited wanted to deliver a finer feed to their cement grinding mills—and thus increase output. To do it, they installed early in 1952, a Telsmith 48 Fine Crushing Gyrasphere to crush cement clinker from 2" to minus  $\frac{3}{8}$ ".

They are thoroughly satisfied!



48-S Telsmith Standard Gyrasphere in Kosmos Portland Cement Co. plant at Kosmosdale, Kentucky.

The Kosmos Portland Cement Co. has operated their Telsmith 48-S Gyrasphere 24 hours a day since July, 1951—crushing 100 tons per hour of 220 to 275-degree limestone from  $4\frac{1}{2}$ " down to  $\frac{5}{8}$ ".

They are thoroughly satisfied!

Send for Bulletin No. 274

Y-13

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Used in Combination with EASTON Pan Type Side Dumps**

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# ROCK

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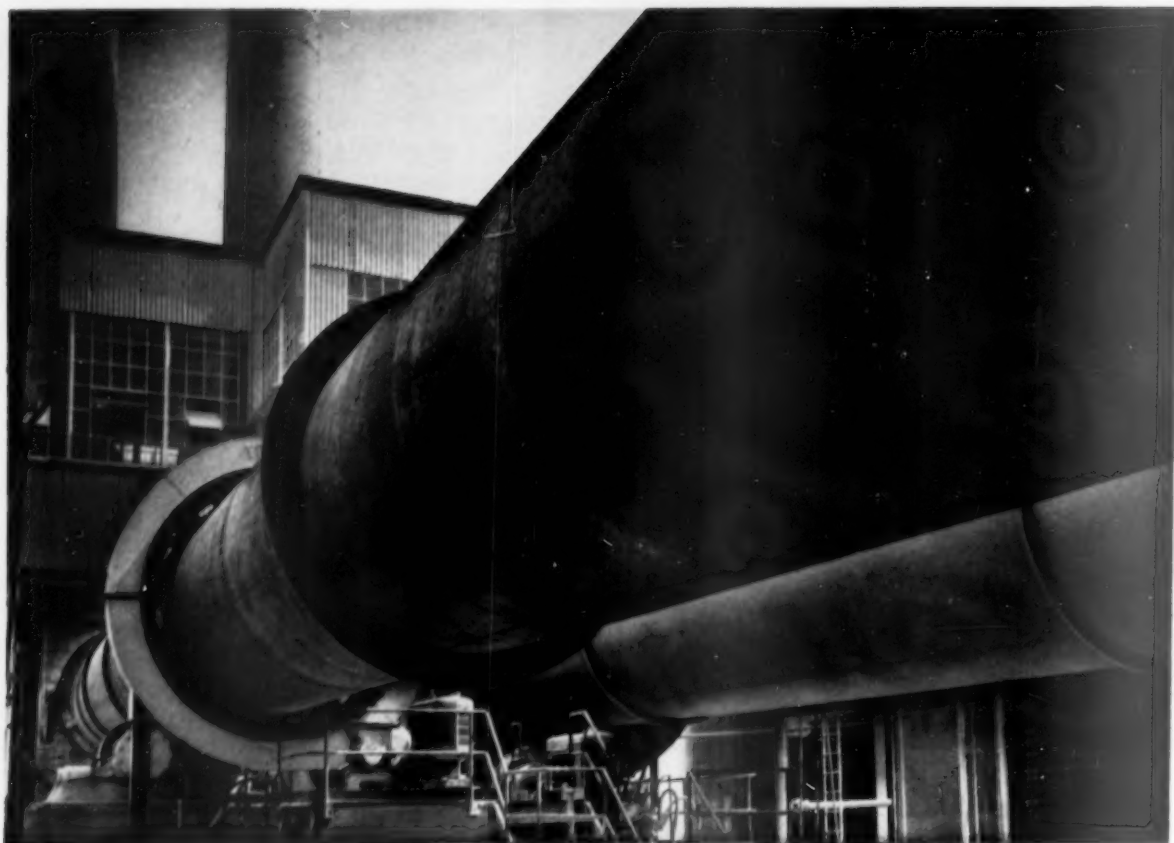
Fifty years . . . . . 1906-1956 . . . . .  
of Aid to Business Progress





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American Business Journals, Zaehring-  
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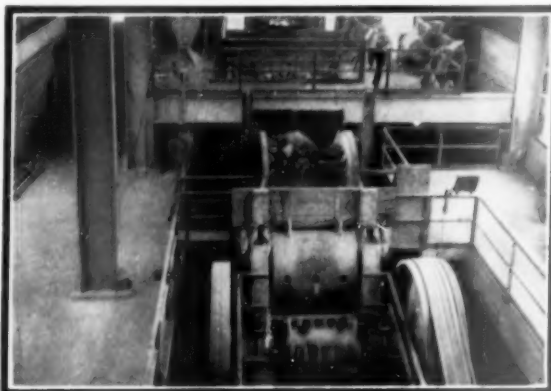
Georg J. Linder, Wittesbacher Allee 60,  
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**TRAYLOR ROTARY KILNS**, long the standard of quality in the cement industry, feature the superior strength of all-welded steel shells plus the convenience of readily adjustable supports. These Traylor features assure perfect alignment to cut maintenance costs and reduce power requirements. Kilns are "Traylor-made" for each individual installation. Sizes have been built to 12' in diameter and to 450' long.

**TRAYLOR JAW CRUSHERS** are "Traylor-made" to provide the massive construction needed for 'round-the-clock heavy-duty primary breaking. Five types and 33 sizes are available with feed openings from 8' x 12" to 60' x 84", featuring Traylor's original curved jaw plates which deliver greater hourly production of finer product on lower maintenance cost and reduced power requirements.

**C**EMENT is in short supply. You can sell all you can produce. Production shortages represent a very real profit loss to you. That is why it will pay you to cure any such shortage *before* it becomes a reality in your new or remodeled plant. Traylor Cement Machinery has a world-wide reputation for delivering a bonus of extra production over other equipment of comparable capacity. This is the result of Traylor's specialized interest in developing the best possible equipment for the Cement industry. Naturally this specialization has resulted in many design features that have proved to be the cure for many cement production shortages. Let a Traylor engineer go over your Cement Plant plans with you with an eye to curing production problems early. There's no obligation . . . just drop us a line today.



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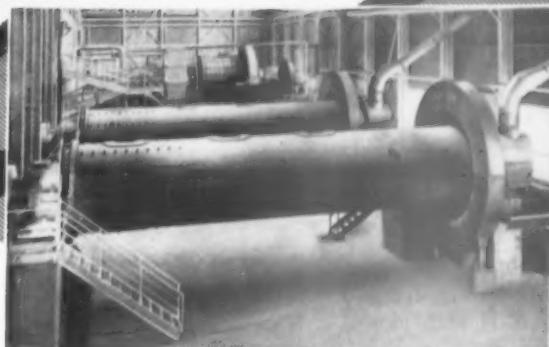
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**TRAYLOR REDUCTION CRUSHERS** are outstanding examples of simple, compact design that combine maximum strength with peak operating efficiency. Spring suspension affords protection against tramp iron, bronze bushed eccentric assures long trouble-free service. Traylor's famous self-tightening Bell Head and Curved Concaves produce consistently uniform products with fewer waste fines. Six sizes with feed openings from 1½" to 22".

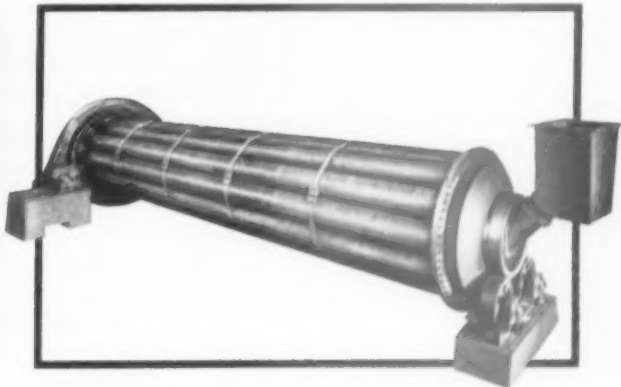


**TRAYLOR GRINDING MILLS** include Rod, Compartment, Ball and Tube Mills. Sizes to meet practically every requirement. Special mills are also available.



*"A Traylor leads to greater profits"*

## CEMENT PRODUCTION



**TRAYLOR MULTIPLE TUBE COOLERS** for special applications are available as water cooled, air cooled or a combination of air and water cooled. Built to individual specifications, Traylor Multiple Tube Coolers provide the same construction features and operating economies as Traylor Kilns.

Descriptive literature outlining all the design and operating features of Traylor machinery is available on request. Write, stating your specific interest, and a copy of the appropriate booklet will be sent you.

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#### Intense heat no problem for Super Belts

This hydraulic press at Hackney Iron and Steel Co., Enid, Oklahoma, shapes red hot steel plate into tank heads.

The flat leather belt formerly used on this type of press, would stretch, slip, and come off. Tightening the belts only overloaded the bearings. For this press, a Gates Super Vulco Rope drive was chosen because it withstands the near-by intense heat, and its extra horsepower capacity permits lighter weight sheaves; thereby reducing load on bearings.

Claude King, maintenance superintendent, reports: "This Gates V-belt drive has operated 8 hours a day for 5 years without lost time due to maintenance."

#### Super Belts on vibrator last 7 times longer

James Gann, general superintendent of John B. LaGarde, Inc., Anniston, Alabama, reports:

"Practically every condition exists to shorten V-belt life on the vibrator drive of this concrete block machine. The machine starts and stops 4 times a minute. Intense vibration must be absorbed by the V-belts to protect motor and bearings. Sand and concrete, oil and grease all get into the drive.

"With Gates Super Vulco Ropes, we get about 7 times the average life we received from any other make. It is hard to believe that belts can take this punishment, but Gates Super Vulco Ropes do it."

# Solve tough drive problems with this super tough V-belt

If present V-belts are wearing out too fast... if heavy shock loads... oil and heat... or other conditions are causing too frequent replacement... here's the answer:

**Gates Super Vulco Rope—the oil and heat resistant V-belt with 40% more horsepower capacity. Easily handles heavy shock loads.**

That means longer V-belt life and *cost savings two ways*—savings on belt replacements and savings on maintenance down-time.

Let a Gates V-Belt specialist help you solve *any* tough drive problem. He'll make recommendations without obligation. Gates offices and distributor stocks are listed in the phone book yellow pages in all major industrial centers. The Gates Rubber Co., Denver, Colorado—*World's Largest Makers of V-Belts.*



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Specialized Research

TPA 104

# Gates SUPER VULCO ROPE Drives

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ROCK PRODUCTS, August, 1956





*More hauls—fewer overhauls—*

with **Gulf Lubricants and Fuels**  
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Helping quarry operators keep equipment working smoothly and efficiently is an important part of Gulf's business—made possible by a complete line of high quality lubricants and fuels, plus practical petroleum engineering service.

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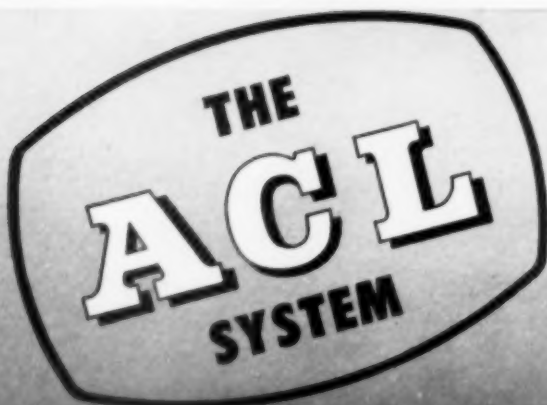
Consult the telephone directory for the number of your local Gulf office, or write on your company letterhead to the address below.

**Gulf Oil Corporation • Gulf Refining Company**

1822 Gulf Building, Pittsburgh 30, Pa.

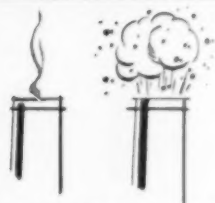


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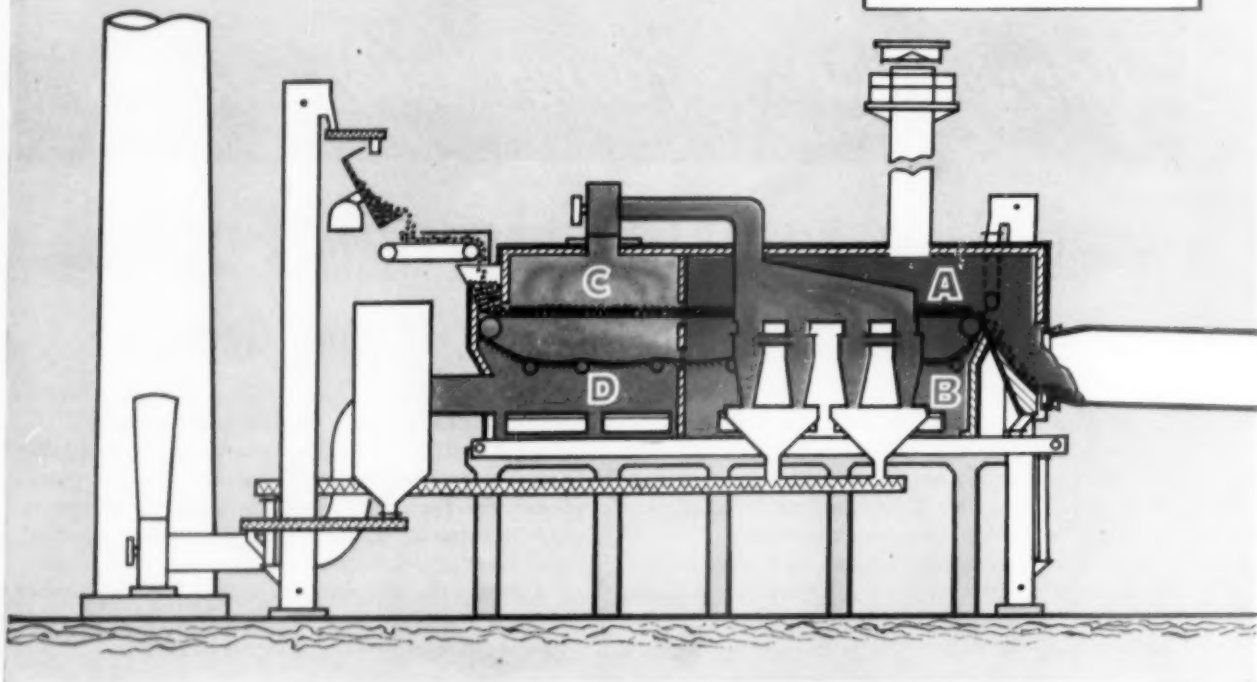
# Cuts Cost

... puts you in a  
better competitive  
position — **HERE'S WHY** ▶



## LESS DUST LOSS

Double pass of gases through traveling bed of pellets reduces dust loss below 1% of feed weight without an additional dust-collecting system. Valuable processed material is saved. Dust load of exhaust gas is lower than in any other system.

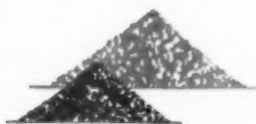


**Traveling Grate Affords Many Advantages** Because feed volume on traveling grate is constant, kiln operation is uniform and more efficient. There is no segregation of mix. Pelletizing locks in and maintains proportions of components. "Flushing" is eliminated, "ringing" minimized. Voids between pellets permit escape of moisture and gases without fluidization of bed. Because clinker maintains pelletized characteristics, it moves through the rotary kiln uniformly and burns easily.

**E**FFECTIVE DUST FILTRATION ... efficient heat transfer ... more uniform, better burning clinker ... substantial savings in fuel, power requirements, space and manpower ... maintenance economy—all these im-

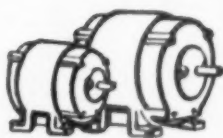
# ALLIS-

# of Producing Cement



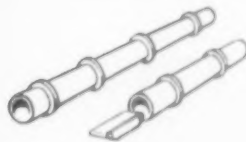
## LESS FUEL

Fuel consumption for ACL systems now in operation averages 600,000 Btu per barrel of clinker. Conventional long, dry-process kilns range from 750,000 to 1,000,000 Btu. Powdered coal, fuel oil, natural or coke oven gas may be used.



## LESS POWER

The ACL system for burning cement clinker requires about 2.3 kw/hr per barrel of clinker for operation of kiln department. This is about one-third less power than required by rotary kilns using other pre-heating systems.



## LESS SPACE

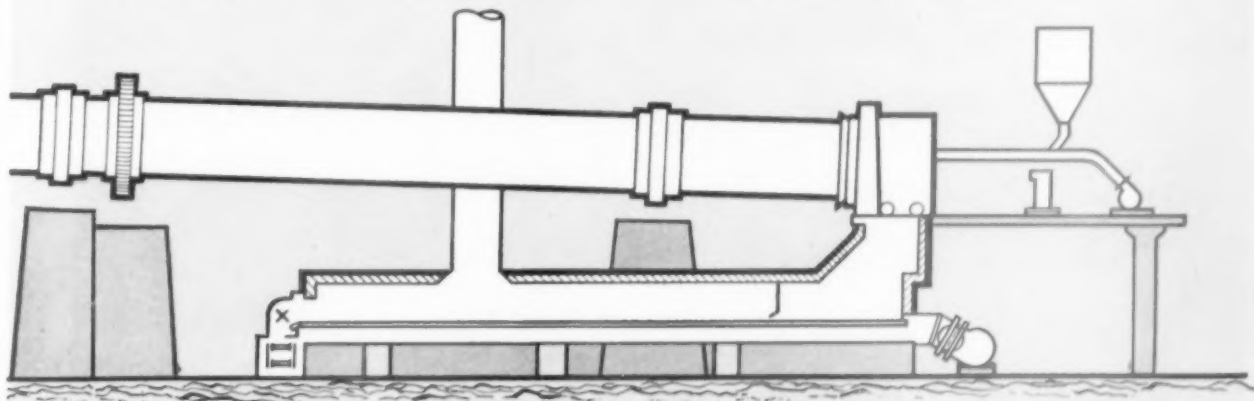
Entire ACL system—grate, kiln and cooler — is about 40% shorter than conventional long kiln installations. The totally enclosed traveling grate is about as high as the average kiln feed end housing.

### How the Double-Pass System Works

Partial calcining and dust reclamation take place as hottest gases pass through the pellet bed on traveling grate. Gas temperatures are reduced from about 1800 to 500 degrees in this first pass (A to B). Next, gases pass through cyclones where larger dust particles

are removed, and carried back to pelletizer. Final dust filtering takes place as gases pass through moist pellets on feed end of grate. In the second pass (C to D) gas temperatures are further reduced.

ACL is an Allis-Chalmers trademark.



portant advantages, and many more, are yours with the ACL system.

**New Bulletin Available** A new bulletin, describing the ACL system, Allis-Chalmers kilns and kiln auxili-

aries, is ready for distribution. To get your copy, see your nearby Allis-Chalmers representative or write Allis-Chalmers, Industrial Equipment Division, Milwaukee 1, Wisconsin. Ask for Bulletin 07B8431.

**58 Installations by  
Lellep Licensees  
since 1950**

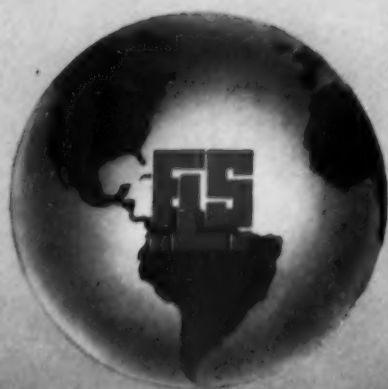


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# CHALMERS

ROCK PRODUCTS, August, 1956

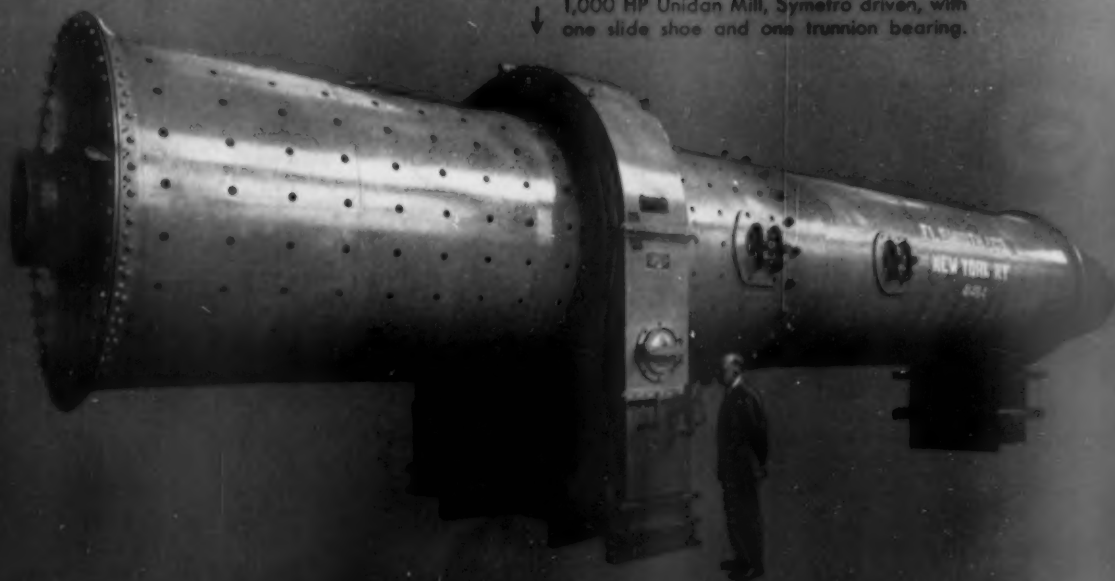


# SMIDTH

## Grinding Mills

Ball Mills and multi-compartment Unidan Mills for wet and dry, open and closed circuit grinding and air-swept Tirax Mills for simultaneous drying and grinding. Auxiliary equipment for mills. Special features include the Smidth slide shoe bearing and the Symetro Drive.

↓ 1,000 HP Unidan Mill, Symetro driven, with one slide shoe and one trunnion bearing.



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# What's Happening

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IN OTHER FIELDS OF INTEREST TO THE ROCK PRODUCTS INDUSTRY

August, 1956

**A surge in bottle-making** is resulting from the demand by industry for glass containers in all sizes, shapes and forms. New machines for bottle-making are being developed, such as the G-50 made by Owens-Illinois Glass Co. which can produce a container as much as 20 percent lighter but just as sturdy as its forebears at twice the average rate of some of the older type units. New devices promise cheaper packaging, reduced distribution costs, safer and more convenient bottles, and attractive display for the country's wares. Bottle shipments last year were up 8.7 percent over 1954, and the glass industry ranked fourth in the packaging market, behind makers of paperboard, metal cans, and paper and textile bags.

**Ceramic construction block** utilizing expanded shale aggregate and clay found in the Chicago area has been developed at Armour Research Foundation of the Illinois Institute of Technology. The block is made in much the same way as a concrete product, except that clay is the binding element instead of cement, and after molding the block undergoes firing instead of moisture-curing. It is believed by Al Litvin, supervisor of masonry materials, that acoustical and heat properties will be favorable, and that cost will be comparable to that of manufacturing concrete block. Weight of the block is about 22 lb.

**Fibers from kaolin** which has been electrically melted and blown through a tapering nozzle are being developed in Alliance, Ohio, by Babcock and Wilcox. Their product has been named Kaowool. The fibers, 8-in. long and 3 microns in diameter, are collected on a pad-forming conveyor. An insulating material is produced for use in jet engines, guided missiles, steam turbines, fire-resistant building incinerators, ovens, and hot-air ducts, as it may be subjected to temperatures of 2000 deg. F.

**A powder nozzle**, designed by Linde Air Products Co., was recently used to remove a large, oblong concrete storage structure from a factory building at Tonawanda, N. Y. The powder nozzle permitted cutting the concrete with a standard industrial powder-cutting blowpipe. Using the nozzle, clean, straight cuts were said to result on both the vertical and horizontal planes, reducing the concrete to easy-to-handle squares.

**The law providing housing** for essential civilian employees of the military will open up a market for 10,000 houses, according to **Engineering News-Record**. F.H.A.-insured mortgages are available now to these people, who comprise the scientific and technical personnel at bases being built up to take care of guided missiles and other programs.

**The Dallas District of the Texas Highway Department** plans to use 4 percent hydrated lime subbase stabilization on a 12-mile, four-lane freeway near Dallas, rather than excavate and remove the unstable subgrade and replace it with improved material, which is more costly.

**Ultrasonic sound** is the slicing agent which Army scientists at the Signal Corps Engineering Laboratory, Fort Monmouth, N. J., plan to use in cutting paper-thin wafers of quartz, vital for radar, guided missiles, radio, TV and telephone tubes. Designed by the Raytheon Manufacturing Co., and perfected to meet military standards, the experimental slicer has a bit resembling a closely stacked pack of razor blades. The bit does not touch the quartz, but as it vibrates—25,000 times a second—boron particles from boron carbide, which are flowing between the slicer and the quartz, rapidly and simultaneously cut 21 delicate slabs, giving three times as many usable wafers from a block as the best diamond saws.

**Sao Paulo, Brazil**, will be the site for the world's tallest concrete building when the 45-story Italia Building is completed about 1960, according to **Engineering News-Record**. Elliptically shaped, like the stacks of a giant ocean liner, the building will have a major axis of 184 ft. and a minor axis of 76 ft. It will be supported at its base by 48 cylindrical concrete caissons, 10-ft. in diameter and 100-ft. deep. The first five floors of the building will comprise a base section of 23,300 sq. ft. in area, above which the remaining 40 floors will tower.

**Florida's State Conservation Board** is pinning its hopes on steamed oyster shells and broken concrete block and tile to rehabilitate Bay County's oyster industry. Oysters will use the shells and other foreign subjects to cling to and grow, says a survey team of the oyster division of the conservation board. Several thousand tons of the shells, plus concrete materials to be supplied by a masonry manufacturer, were to be spread in the bays off Panama City, Fla.

**Six-year building outlook** is forecast as promising. Value Line Investment Survey expects the huge reservoir of public construction, plus maintenance and repair expenditures on the record number of homes, to swell construction outlays to \$65 billion by 1962. This is \$22 billion above projected 1956 levels. Home construction over the six-year period is expected to remain stable, reflecting the low birth rate of the '30s.

**Lepidolite ore from Africa**, after being fine-ground and mixed with limestone, is roasted in a rotary kiln at American Potash & Chemical's subsidiary, American Lithium Chemicals, at San Antonio, Tex. After roasting, soluble lithium and potassium salts are leached out of mixture, and from resulting solution, lithium hydroxide is recovered by concentration and evaporation.

**Synthetic granite** is a recent product of the mineralogical laboratory at Paris University. French scientists described the process before the Academy of Sciences. About 100 hours are required for the operation, in which mineral constituents of granite are kept at a constant temperature of 600 deg. C. and subjected to extreme pressure. Small pieces of granite result.

**Heavy construction awards**, nationally, totalled \$10,947,300,000 for the first 25 weeks of 1956, are reported in **Engineering News-Record**. This was an increase of 22 percent above the corresponding period in 1955.

THE EDITORS



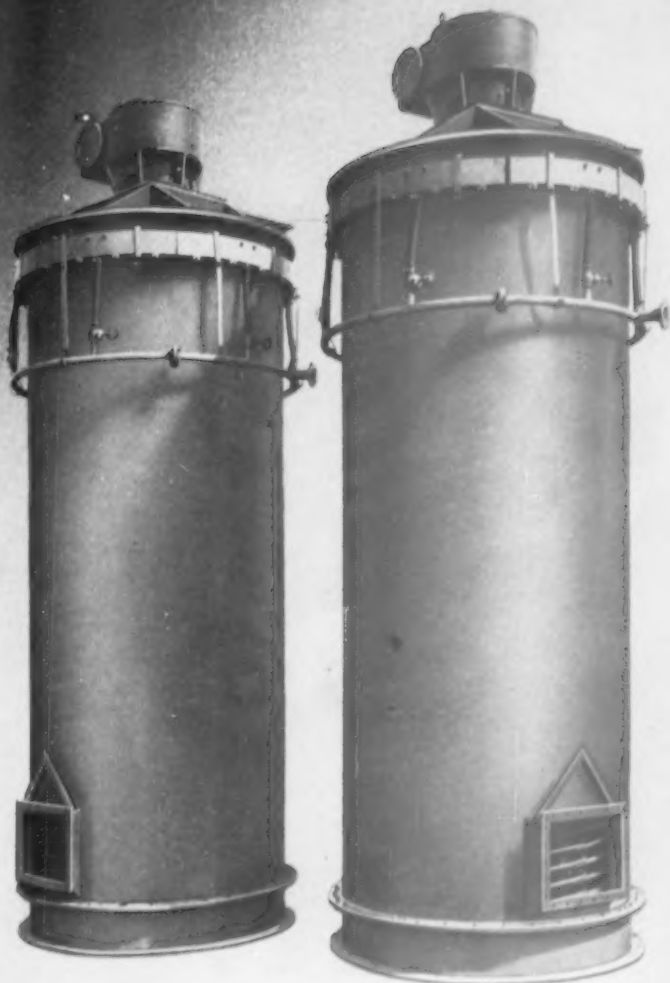
# SMIDTH

## cement coolers

The Smidth Cement Cooler, developed especially for cooling hot cement to temperatures acceptable for bulk shipment or immediate bagging, is externally water-cooled. The hot cement is introduced at the base and conveyed in a thin layer along the cooled interior surface to the top, where it is discharged. High cooling efficiency is assured by the intimate contact of cement and the water-cooled surface.

The Smidth Cooler may also be used with many other similar dry pulverized materials.

Illustrated here are two 6' 6" dia. x 17' 7" high Smidth Coolers ready for shipment.



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## KOEHRING WORK CAPACITY *in action . . .*



**Quarry rock** — Take another look at the heavy-duty shovel (above), loading rock at a Midwest quarry. It's the new Koehring ¾-yard 305, with 18-foot deep-section boom, and 15-foot dual dipper-sticks. In heavy digging like this, operators like the light lever-pull of its big power clutch, and accurate "feel" of load. *You'll* like its extra work capacity with all attachments, on crawlers or rubber (see ratings on next page).

**Mining phosphate** — After stripping overburden at a Southern mine (right), 605 dragline loaded phosphate out of the deep cut. It has plenty of work radius for this type of operation — can be used with 50 to 110 feet of boom, and handles 1½ to 2½ cu. yd. dragline or clamshell buckets, depending on weight of materials. Better check what this big Koehring 605 can do on your excavating, lifting and material-handling.



**21.5 m.p.h. Cruiser®** — One man controls all operations, one engine supplies all power for work and travel on the new Koehring 205 Cruiser Crane. There's a full range of low working speeds to 7 m.p.h. — plus travel speeds up to 21.5 m.p.h. Has smooth torque-converter drive, power-steering, climbs 30% grades. Usefulness is unlimited in mines, pits and quarries. It lifts up to 15 tons — handles  $\frac{1}{2}$  to  $\frac{3}{4}$ -yard clamshell or dragline buckets — converts to shovel or hoe. Versatile Koehring 205 also is available on truck mounting or on heavy-duty crawlers (more details below).



**Stockpile specialist** — Owner of this yard put stockpiling on a big-tonnage basis with a 405 clamshell crane. Its smooth swing, fast line speeds, and wide work radius pay off on all kinds of material-handling. This 405 is another in the modern, new series of Koehring excavators and cranes. Want more information? Call your Koehring distributor today.



Here are some figures that will interest you:

KOEHRING MODEL	SIZE DIPPER	LIFT CAPACITIES	
		(Crawler ratings based on 75% of tipping load. Rubber tired machines — 85% of tipping load.)	
205 CRAWLER	$\frac{1}{2}$ Yd.	20,000 lbs.	at 10-foot radius
205 ON RUBBER	$\frac{1}{2}$ Yd.	30,000 lbs. 13,700 lbs.	at 12-foot radius at 20-foot radius
305 CRAWLER	$\frac{3}{4}$ Yd.	30,000 lbs.	at 12-foot radius
305 ON RUBBER	$\frac{3}{4}$ Yd.	50,000 lbs. 15,800 lbs.	at 10-foot radius at 30-foot radius
405 CRAWLER	1 Yd.	40,000 lbs.	at 12-foot radius
605 CRAWLER	1 $\frac{1}{2}$ Yds.	72,300 lbs.	at 12-foot radius
1205 CRAWLER	3 Yds.	190,000 lbs.	at 13-foot radius



**KOEHRING COMPANY** Milwaukee 16, Wis.

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To provide you with exactly the *right* rope for each requirement, MONARCH WHYTE STRAND is made in every wire rope classification, PRE-formed and Internally Lubricated, Lang Lay or Regular Lay, with Fiber Core or Independent Wire Rope Core.

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## EDITOR'S PAGE

### WANTED: ENGINEERING TALENT

**T**HE ESTIMATED SHORTAGE OF GRADUATING ENGINEERS this year—and projected shortage for years to come—poses a serious problem for the expanding cement industry. Steps should be taken now to woo young engineers into the business for competition from other industries in attracting new engineering talent will become more pointed in the years ahead.

The college graduating classes of 1956 were short some 15,000 engineers to meet this country's current demand of 40,000. The acute situation has hundreds of industries and thousands of companies fighting for the talents and services of new graduates. Some companies are known to have requested entire graduating classes of engineer specialists from certain schools.

Right now, there is no foreseeable end to the situation. It has been estimated that possibly ten percent of graduating high school students can qualify for college engineering curricula. But not all of those graduates seek higher education, and of those who do only a relatively small percent register in various branches of engineering. More serious, some colleges and universities graduate less than 20 percent of those who enroll as freshmen in engineering. It is not difficult to see why new engineers are coming on the market at a low rate of about 23,000 per year.

Best engineering talent is going to those industries and to those companies within the industries that do the best job of selling themselves and their future prospects to these new career men. The new graduates know it, and they're going to take the best deal they can get. It's a deplorable situation for industry, perhaps, but that's the way it is.

It couldn't come at an unhappier time for the cement industry. Right now, that industry is in the midst of the most ambitious expansion program in its history. Efficient new plants and plant additions cannot be built without good engineering talent, and the load on current industry engineers is growing daily. Probably never again will there be such an urgent need to attract and train young engineers for careers in cement as right now. In this situation, let's look at some salient facts.

- Most new college engineering graduates know little about careers in the cement industry.
- No industry-wide effort is being made to attract engineering students to the cement industry on a career basis.
- Few companies have made a real effort to sell their industry or company to engineering graduates; some have followed the routine of listing job openings with college personnel departments, but that is all.

Other industries, by contrast, are **bidding** for the

graduates. They are spending lavishly on scholarships, exhibits, educational aides, personal interviews and other methods to gain the new engineers they want and need. Some provide transportation and expense-free tours for students—singly or in groups—on plant inspection trips. Selling prospective employees on their industries is routine for some. For those industries that don't, the inevitable result is little opportunity to get the best.

What better investment can the industry make than in the young men who some day will hold the administrative reins? There are several ways to make those wise investments.

- Establish higher education scholarships in quantity. Send able and deserving high-school graduates through engineering courses that point to careers in the cement industry. The idea has paid handsome dividends to other industries, and there's no reason why cement should not benefit from such a program. Scholarships could be offered by individual companies in their own states, or through a national organization.

- Start and expand a program—preferably through a national organization—to introduce and explain careers in the cement industry to college students. Travelling exhibits, personal lectures, planned and organized visits to campuses by industry leaders, and many similar devices may be used to gain proper results.

- Provide a series of professional color movies that tell cement's story—its great importance to the economy. Make the films available for engineering-group meetings on campuses—even to TV programs and movie houses. The one such film on the industry has been popular, but it's not enough.

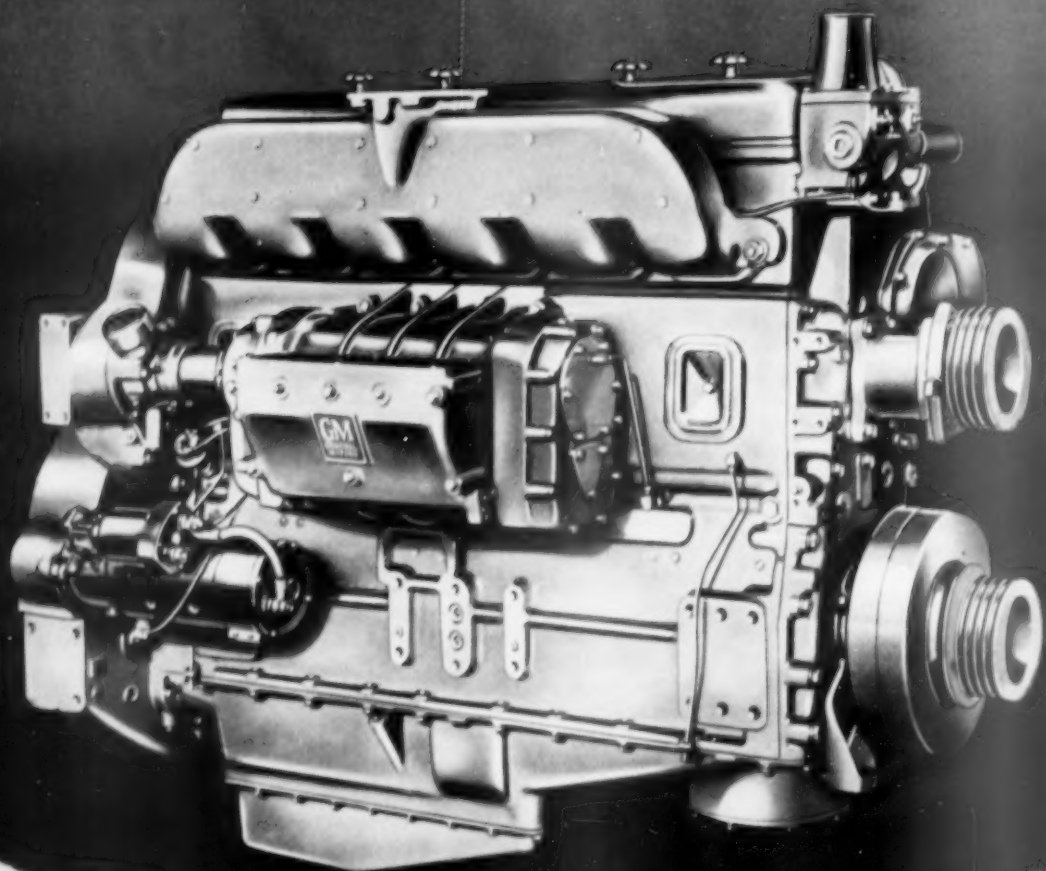
- Tell the story where it counts. Install an information bureau for schools, complete with pamphlets and publications that explain what the industry, its products and its facilities are, and what they contribute.

The cement industry is basic to the nation's economy. Its importance has been highlighted by recent federal legislation to expand the highway system for personal safety in travel during peacetime, and for national flexibility during wartime. It cannot expand nor progress without the proper quality and quantity of engineering talent. Under the present situation, that talent must be bargained for. The industry today should not allow its future leaders to be acquired by default.

*George C. Lindsay*

*New! More Compact!*

**GM DETROIT DIESEL**





# More Versatile!

## 300-H.P. SERIES 110 ENGINE

*Now available to fit a broader range of power equipment*

Now the best 300-horsepower Diesel is even better than ever—ready to step up production and cut costs on any job you name.

It's the time-proved General Motors Series 110 Diesel, newly equipped with a side-mounted blower similar to the one used on the famous 71 Series. It's a more compact engine. It's shorter. It's lower. It fits more applications than ever before.

You can have this new GM Detroit Diesel Series 110 engine installed in off-highway trucks and move bigger loads faster.

You can use it to increase the power of heavy crawler tractors, scrapers and air compressors—get more work per day and per dollar.

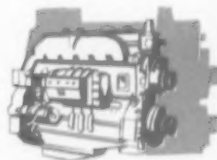
And, in practically no time at all, you can have this new Series 110 Diesel installed in almost any 3-yard shovel—to move earth faster at less cost.

The new blower makes the Series 110 engine far more versatile—available with *either* right- or left-hand rotation, and a wider range of accessory drive outlets—*four* accessory drives on the rear of the engine, and *four* fan-mounting positions on the front.

This new Detroit Diesel Series 110 engine takes on all comers in operating efficiency. It's a leader in work output per dollar. Let your local GM Detroit Diesel Distributor or Dealer show you what we mean.

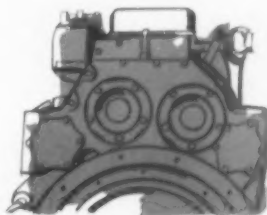
### **New Compactness—**

The side-mounted blower eliminates former style blower at the end of the Series 110 engine and also cuts down height. Easier to install—easier to maintain.



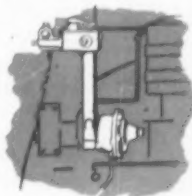
### **New Flexibility—**

Four accessory drive outlets on rear of engine. You can direct drive both a hydraulic pump and an air compressor off the engine at the same time. New gear train features wider gears with increased helix angle for longer life. Blower and camshaft loads are split.



### **New long-life Cylinder Head**

Has many design improvements, including integral water manifold and drilled passages for rocker-arm lubrication. Water manifold studs and gaskets eliminated. Outside rail gives extra rigidity.



### **New Governor**

Is more easily serviced—utilizes many Series 71 parts. Provides for tachometer drive. An accessory drive may also be taken off the governor drive gear.



## DETROIT DIESEL

Engine Division of General Motors, Detroit 28, Michigan

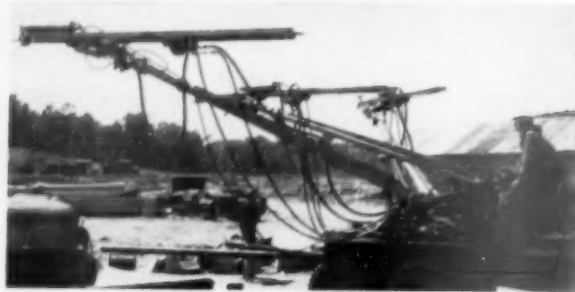
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## Discharge Commuted to One-Week Layoff in "Attempted Theft" Case

IN A RECENT CASE settled by arbitration, discharge of an employee based upon having in his possession, upon leaving the plant, various unissued company items was commuted to a one-week layoff. The original company action was considered to be too strict, since there was no basis for finding that the employee intended to steal this material. On the other hand, disciplinary action was required since the employee violated a company rule by failing to obtain authorization for taking the material out of the plant.

The case involved the Universal Atlas Cement Co. plant at Buffington, Ind., the grievance being submitted by United Steel Workers of America, Local 1711 (AFL-CIO). The decision was reached on May 9, 1956, by Harold M. Gilden, single arbitrator who was selected by both parties. The issue was whether employee J. O. was discharged with proper cause under provisions of the labor agreement dated July 28, 1954, as amended, between the cement company and union. What follows was taken from the arbitration report.

### Nature of Case

"On leaving the premises after completing his day's work on Jan. 25, 1956, J. O., a welder, was stopped at the gate by the plant protection officer and requested to disclose the contents of his trouser and coat pockets. Among the variety of personal belongings on his person were several items of company property; namely, one set of cutting tip cleaners, one terminal lug, about two feet of strip solder, one No. 2 burner tip, and one pair of welding goggles. The welding goggles were an issued item, chargeable to O., and there was no objection to his carrying them to and from work; but he did not have a pass authorizing the removal of the other objects from his work area. O. was suspended for a discharge effective January 26. A grievance was promptly filed, and following the holding of a hearing on January 31, 1956, the company decided to convert the suspension to a discharge. The grievance was not resolved in step 3 of the grievance procedure, and it was ultimately progressed to arbitration.

"In explaining his conduct on this occasion, O. related that during the

morning of Jan. 25, he took it upon himself to lengthen the ground cables attached to his welding machine, and in furtherance of that project he obtained a lug from the welding shop storeroom by snipping same off from the short piece (about 3 ft.) of cable to which it was fastened; that while he was in the process of soldering the lug to the extension wire, a foreman assigned him to perform a certain burning job; that he thereupon placed the lug and solder in his pocket pending a suitable opportunity to complete the coupling; that he was busily occupied with the burning task until quitting time and since he lives near the plant and goes home in his work clothes, the material was in his possession when he walked out of the gate; that all the welders customarily carry welding tips of different sizes as well as tip cleaners in their pockets and he had frequently carried these objects back and forth through the gate. O. was originally hired on February 3, 1947. His work record is free from any previous disciplinary notations.

### Contentions

"The union says that O. made a good faith attempt to remedy an unsafe condition in his work equipment; that it is utterly unrealistic to imply that O. assumed extra curricular duties merely to gain possession of about 30¢ worth of material; that there is no proof that an electrician was available to make the coupling for him; that O. had frequently spliced and repaired his own cable without objection by his supervisor to this practice; that the evidence does not establish that O. was guilty of dishonesty and therefore the discharge was improper.

"The company points out that O. never complained that the ground cable on his welding machine needed lengthening; that if this matter had been brought to the foreman's attention either O. would have been given a set of electrical connectors to use in making the coupling, or an electrician would have been detailed to handle the job for him; that O. walked approximately 160 ft. from his work location in the screw repair area to the welding shop storeroom to secure the extra lugs rather than travel about 20 ft. to the foreman's office to requisi-

tion the necessary material; that in cutting the cable to remove the lugs, O. thereupon rendered it unusable for further use as an extension cable; that O. had a tool box and a locker where he could have stored these materials overnight; that O. was aware of the established regulations requiring that a pass be obtained for the removal of the company property from the plant premises; that sometime after quitting work O. transferred this material from his trouser pockets to his jacket; that O. was discharged for attempting to carry company equipment not issued to him out of the plant, and that the monetary value of same is not material; that the grievance should be denied.

### Applicable Contract Provisions

#### "Section 3—Management

"The company retains the exclusive rights to manage the business and plant and to direct the working forces. The company, in the exercise of its rights, shall observe the provisions of this agreement.

"The right to manage the business and plant and to direct the working forces include the right to hire, suspend or discharge for proper cause, or transfer, and the right to relieve employees from duty because of lack of work or for other legitimate reasons.

"Section 7—Suspension and Discharge Cases.

"C. Revocation of Suspensions or Discharges.

"Should any initial suspension, or affirmation, modification or extension thereof, or discharge be revoked by the company, the company, in the absence of mutual agreement to the contrary, shall reinstate the employee and pay full compensation at the employee's regular rate of pay for the time lost.

"D. Authority of an Arbitrator in Suspension or Discharge Cases.

"If an arbitrator determines in accordance with Step 4 of the grievance procedure that a suspension or a discharge was without cause, and that the action taken should be modified rather than revoked, he shall have the discretion to reduce or not require the company to pay the compensation provided for in subsection C above."

(Continued on page 210)

## FULLER PREHEATER Humboldt Suspension Type

# GET ALL THE FACTS!

The suspension preheater, introduced and developed by Klockner-Humboldt-Deutz AG, of Koln, Germany, and applied to the American cement industry by Fuller Company of Catasauqua, Pennsylvania, gained an impressive following in the year 1955. In North America, **9 new units** were sold, and **1 unit** put into operation. Outside of North America, **7 new units** were sold, and **1 unit** put into operation. The total of all units sold now stands at **34; 13 of these sales have been to American companies.** The first unit was started at the end of 1950, in the plant of Norddeutsche Hütte, at Oslebshausen, Germany, and it is interesting to note that the remainder all have been sold or installed between early 1953 and the present time.

American experience has confirmed several important advantages that account for the acceptance accorded this method:

### Rapid and efficient heat transfer

A design feature of the Fuller-Humboldt system causes the dry pulverized raw material to be dispersed in the kiln exit gas stream. *The most rapid and efficient transfer of heat possible* is effected because the feed is alternately suspended in the stream, collected, and re-suspended through several stages. Substantial equilibrium between material and gas temperatures is almost immediate at each stage.

### Flexibility . . . increase in output

Experience with the four American units now operating indicates that in addition to a potential for fuel reduction superior to other known methods, the suspension preheater offers unique flexibility. At a slight sacrifice of fuel economy, the operator can take advantage of this flexibility to increase output beyond design capacity by as much as 30%. "Design capacity" for the preheater-equipped kiln already represents an

improvement in the neighborhood of 70% above a kiln with recuperator-type cooler only. It is possible to obtain this additional output and maintain proper gas temperatures for fan and dust collectors through by-passing part of the gas stream. Since all of the raw feed is suspended in the gases in the course of the preheating operation, the matter of gas velocity in the kiln (caused by burning more fuel and feeding more raw material) is not critical.

### Experience

Operating experience confirms a fact related to matters of efficiency and flexibility that is obvious to all experienced operators; namely, that fuel rates, in terms of absolute values, have no meaning unless all other pertinent facts are known. The variables in each application, such as the nature of the raw material, composition of the mix, whether the kiln is operated for maximum efficiency or maximum production, and whether or not part of the gases are to be used for waste heat power production, are all important factors. Fuel rates range from 600,000 Btu/barrel to as high as something above 850,000 Btu/barrel. Specifically, one installation consisting of an orthodox preheater-kiln combination is operated to take advantage of the flexible nature of the system. The kiln's productive capacity is now more than 100% greater than before application of the preheater, and fuel rate is about 660,000 Btu/barrel. Another system involves a hard burning mix and the use of part of the kiln exit gases for waste heat power production. Under these conditions, the fuel rate is about 850,000 Btu/barrel, but even so, a saving of 500,000 Btu/barrel has been effected.

With respect to clinker quality, the output of the units in current operation has been consistently high, and in all instances, of improved density and lower free lime as compared with clinker produced by other

**FULLER COMPANY, 102 Bridge St., Catasauqua, Pa.**

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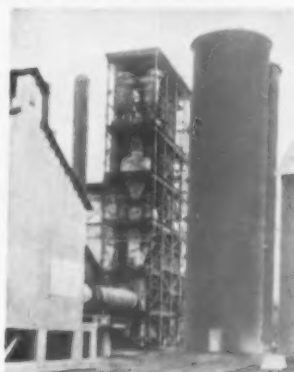




Alpha Portland Cement Company, Catskill plant, Cementon, N. Y. In operation.



Lehigh Portland Cement Company, Fogelsville, Pa. plant. Photo taken during erection. Now in operation.



Allentown Portland Cement Company, Evansville, Pa. plant. In operation.

kilns at the same plants. Segregation is no problem, because the nature of the system causes recycling of the material within the circuit within seconds of introduction, so that the formation of the compounds is in no way impaired.

### Operation from burner floor

No additional labor is required, and it is entirely practical to operate the preheater from the burner floor.

### Maintenance at minimum

Because of the simplicity of design, material of construction, and lack of moving parts, *maintenance requirements are minimum*. The moving equipment comprises the fan, dust conveyor, and feed conveyor, all of which operate in normal temperature ranges. Operations at the plant of Allentown Portland Cement Company, Evansville, Pa., where the first American installation was made by Fuller Company, have been closely observed since 1953. In the approximately three years' operation, it has not been necessary to do more than make minor repairs or adjustments. It was also confirmed here and on later installations that operation from the burner floor is entirely practical.

In summary, the Fuller-Humboldt Preheater offers:

1. Superior efficiency.
2. Flexibility that permits production well in excess of design capacity.
3. No extra labor for preheater operation.
4. Maintenance requirements at a minimum.

Fuller Company has broad operating experience both at home and abroad. Fuller's engineers have first-hand design, erection, and operating experience to offer in studying your requirements. We urge that you let us cooperate in investigation of all the facts and factors before you make your decision.

### FULLER PREHEATERS INSTALLED\* OR ON ORDER

\*Allentown Portland Cement Company  
Evansville, Pa.

1 PREHEATER

\*Alpha Portland Cement Company  
Cementon, N. Y.

1 PREHEATER

\*Lehigh Portland Cement Company  
Fogelsville, Pa.

1 PREHEATER

\*North American Cement Corporation  
Hagerstown, Md.

1 PREHEATER

Huron Portland Cement Company  
Alpena, Mich.

2 PREHEATERS

Nazareth Cement Company  
Nazareth, Pa.

1 PREHEATER

Medusa Portland Cement Company  
Dixon, Ill.

3 PREHEATERS

Ideal Cement Company  
Boettcher, Colo.

2 PREHEATERS

Whitehall Cement Manufacturing Co.  
Cementon, Pa.

1 PREHEATER



... DESIGNERS AND BUILDERS OF BETTER CEMENT-PLANT EQUIPMENT FOR THIRTY YEARS ...

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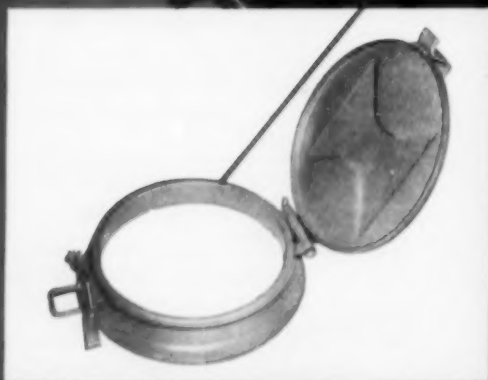
ROCK PRODUCTS, August, 1956

2454  
PB-57

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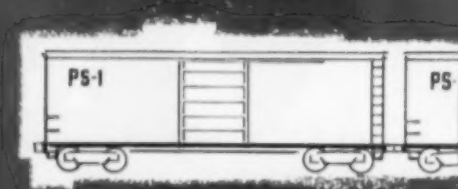
# the PS-2

## COVERED HOPPER



### WEATHERTIGHT HATCH AND HATCH COVER

The hatch coaming of the PS-2 is of one-piece pressed steel, welded to car roof sheets. With an internal diameter of 2'-6" the coaming rises 6 1/2" above the roof surface. Note how the upper lip of the coaming is curved down to help exclude weather and dirt. The hatch cover, also of one-piece pressed steel, hinges so that when open it lies on the roof between the running board and the roof edge. It does not block the running board. The hatch cover fits tightly onto the curved lip of the coaming, and makes a tight seal on the entire coaming circumference. Hatch cover locking device is positive, simple and easy to operate.



BUILT TO SERVE



BEST ON THE

## GREAT AMERICAN RAILWAY System

BY PULLMAN-STANDARD

# **keeps bulk shipments CLEAN and DRY**

**faster loading and unloading, too,  
mean important time and money savings  
for shippers and consignees**

Built by Pullman-Standard, leader in the carbuilding field, the PS-2 Covered Hopper Car is standardized for maximum service to shipper, consignee and railroad.

For any dry lading capable of being shipped in bulk the PS-2 offers assurance that dirt and weather will be excluded. Patented Pullman-Standard circular hatches are designed so that driven rain cannot build up against the coaming and seep up and under the hatch cover. The lip of the coaming is rolled downward as an added weather safeguard. The hatch cover makes firm and smooth sealing contact with the entire circumference of the coaming rim. Special, easy-to-operate latch assemblies hold the covers tightly closed. The properly located circular hatches permit rapid loading and unloading with hose or wand, while the Pullman-Standard design of hoppers, hopper chutes and hopper doors allows fast unloading directly into take-away devices. Hopper doors operate easily, but close securely and positively, permitting no loss through leakage.

The PS-2 Covered Hopper Car is built with worker safety in mind. Hatch cover latch assemblies are located well away from the roof edge. Hatch covers hinge so that opening and closing are parallel to the length of the car: the cover of the open hatch lies on the roof, out of the working area. Workmen perform most operations

from the security of the nonslip running board and it is unnecessary for men to walk on or over opened hatch covers or approach the edge of the roof.

The PS-2 is now in service in two sizes: two hopper, 2003 cu. ft. with 8 loading hatches and 4 unloading doors, and three hopper, 2893 cu. ft. with 10 loading hatches and 6 unloading doors. In either size, every PS-2 is built with the precision craftsmanship that has helped Pullman-Standard become the leader in the carbuilding field. And every PS-2 is thoroughly water tested to make certain that it is completely leak proof.

Standardized freight cars, the PS-1 Box Car, PS-2 Covered Hopper, PS-3 Open Hopper and PS-4 all-purpose Flat Car, are built only by Pullman-Standard. And standardized freight cars are designed, tested and mass produced with the precisely engineered craftsmanship that has made them outstanding in economy, dependability and performance. Shipper, consignee and railroad all benefit through specifying Pullman-Standard Standardized Freight Cars.

More than 9500 PS-2 Covered Hopper Cars have been put into service or ordered by 46 service and shipper-conscious railroads. To learn how the PS-2 could handle your bulk shipments as it does hundreds of materials, write Pullman-Standard.

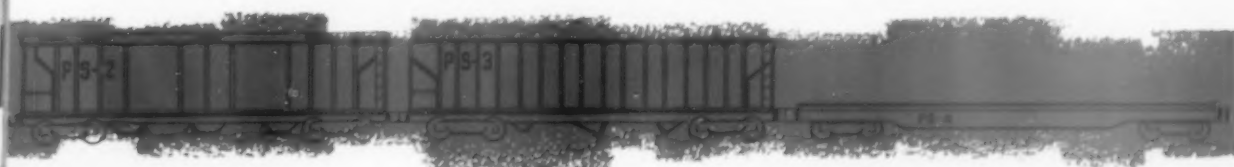
## **PULLMAN-STANDARD**

**CAR MANUFACTURING COMPANY**

SUBSIDIARY OF PULLMAN INCORPORATED

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# A triple threat quarry rig...

**AT ITS RUGGED BEST!**



Just think of the mobility and drilling efficiency you can get from this quarry rig!

**ONE**—you've got a maneuverable 600 cfm. Power Vane Rotary Compressor for a completely dependable air supply. Its oil injection system provides copious lubrication during off-level operation, yet oil consumption is low. A variable speed capacity regulator helps prolong engine life and reduce wear and tear.

**TWO**—you've got a rugged pair of CP Drill Arms.

Both booms are readily adjustable to any drilling position...vertical adjustments are made by a rotary air motor...lateral adjustments are rigidly held by air-actuated post locks. Automatic safety locks prevent boom arms from settling.

**THREE**—and to top it all off, mounted on the drill arms you've got two tubular CP drill carriages that provide all the rigidity and strength necessary to stabilize and feed the two hard hitting, strong rotating CP-70NDC Drifters. Write for details.



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# PEOPLE

## IN THE NEWS



William A. Loewer

### N.C.M.A. Appointments

WILLIAM A. LOEWER has been appointed office and field engineer for the National Concrete Masonry Association, Chicago, Ill., under R. E. Copeland, director of engineering. His duties include writing technical literature and conducting field investigations. William J. Blaha has been named publicity assistant to W. P. Markert, director of promotion. He will prepare publicity material on a nationwide scale and will work on editorial material for newspapers and trade publications. Mr. Loewer received his B.S. degree in civil engineering from the University of Michigan, Ann Arbor, Mich. He was formerly with George H. Fuller Co., Chicago, and



William J. Blaha

Fred Harbers' Sons, Peoria. Mr. Blaha is a graduate of the University of Missouri, Columbia, Mo., and was formerly publicity representative for United Airlines.

### Receives Honorary Degree

GEORGE C. WILSNACK, director of research, Ideal Cement Co., Denver, Colo., was recently awarded an honorary Doctor of Science degree from the University of Denver, for his contributions as a "searching scholar, skilled scientist and eminent researcher." A graduate of Armour Institute of Technology, Chicago, Ill., with a degree in chemical engineering, Dr. Wilsnack joined Ideal Cement Co. in 1942 as general chemist and later became director of research. During his



George C. Wilsnack

career in the cement industry, he has prepared and presented many scientific papers.

### Universal Plant Manager

GILBERT N. PETERSON, plant engineer at the Universal, Penn., plant of Universal Atlas Cement Co., New York, N.Y., has been appointed assistant plant manager at Buffington, Ind. A native of Stevens Point, Wis., Mr. Peterson attended the University of Wisconsin, Madison, Wis., graduating with B.S. degree in mechanical engineering. From 1949 to 1950 he was an industrial engineer with Carnegie-Illinois Steel Corp., Gary,



Gilbert N. Peterson

Ind., when he joined Universal Atlas as mill practice engineer at Buffington. One year later he was made maintenance engineer and in 1952 was promoted to plant engineer at the Universal plant.

### P.C.A. Fellowship Director

DR. FRED D. ORDWAY, Jr., has been appointed director of the Portland Cement Association Fellowship at the National Bureau of Standards, Washington, D.C. He has been acting director of the Fellowship since the retirement of Dr. R. H. Bogue in 1954.

(Continued on page 32)



Dr. Fred D. Ordway, Jr.

another new...  
**PAYLOADER®**



model HH • 1 $\frac{3}{4}$  cu. yd.

# more productive

This new, improved model HH is the finest tractor-shovel in its class ever offered. It has exclusive features that give it tremendous productive capacity for its size and enable it to *go* and *do* jobs where rubber-tire tractor-shovels couldn't operate before.

It handles easier and faster, and rides smoother, with or without a load, than any other make and can out-produce bigger machines. It has balanced design and durability throughout to do a big day's work day-after-day. Your "PAYLOADER" Distributor will be glad to demonstrate its superior performance and greater productive capacity.

**Long-life, high-traction drive train:** Heavy duty planetary final drives in the wheel hubs, and hypoid differential gearing keep torque low in axles . . . prolong life of axles and *all* drive train parts.

**Hydraulic shock absorber:** A shock absorber in the hydraulic system smoothes out the ride, permits faster load-carrying speeds over rough terrain — with less spillage.

**More production, less effort:** Power steer, power brakes (on all four wheels), power shift (no "clutching") and good riding qualities also lessen operator fatigue—promote full production all day.

*1956 Industrial Design Institute top award for styling this "PAYLOADER", was presented to Jon W. Hauser of Jon W. Hauser & Associates.*



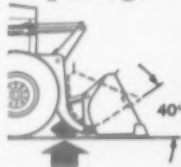
**PAYLOADER**

MANUFACTURED BY  
**THE FRANK G. HOUGH CO. LIBERTYVILLE, ILL.**  
SUBSIDIARY—INTERNATIONAL HARVESTER COMPANY



## Bigger Loads . . . Less Spillage

Special pads on bottom of boom arms give ground support for powerful pry-out action—relieve the axles and wheels of these strains. Bucket can tip back 40 degrees, before raising, to get heaped loads quick and easy even in shallow cuts and low piles, and to retain heaped loads.



## Faster, Easier Operation

The "Paylomatic" transmission in this unit is a complete power-shift type Hough-built expressly for "PAYLOADER" use. It gives instant finger-tip shifting—on the go. There's no stopping for a RANGE shift, no "clutching". The forward-reverse control can also be operated under full engine speed, in any gear . . . all this, plus torque converter drive.



## More Reliable Traction

Four-wheel-drive traction is even more reliable on this unit, because it has torque-proportioning differentials—an exclusive "PAYLOADER" feature. The wheels with the best footing get the most power. You get traction and *action* on sand, mud, snow.



### THE FRANK G. HOUGH CO.

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Send 4-wheel-drive "PAYLOADER" information on:

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1 3/4 cu. yd. Struck	1 1/2 cu. yd. Struck	3/4 cu. yd. Struck

Name \_\_\_\_\_  
Title \_\_\_\_\_  
Company \_\_\_\_\_  
Street \_\_\_\_\_  
City \_\_\_\_\_  
State \_\_\_\_\_

Enter 1025 on Reader Card

Born in Kansas City, Mo., Dr. Ordway received B.S. and M.S. degrees in physical chemistry at Rensselaer Polytechnic Institute, Troy, N.Y., and his Ph.D. degree at the California Institute of Technology, Pasadena, Calif., where he did war research work. He joined the Portland Cement Association Fellowship at the National Bureau of Standards in 1948, and became acting director in 1954.

### A. T. Goldbeck Retires

A. T. GOLDBECK has retired as engineering director of the National Crushed Stone Association, Washing-



A. T. Goldbeck

ton, D.C., and will be succeeded by Joseph E. Gray, field engineer since 1945. Mr. Goldbeck will continue with the Association as engineering consultant. Recently made an honorary member of Committee C-9 on Concrete Aggregates of the American Society for Testing Materials, Mr. Goldbeck



Joseph E. Gray

has served on this committee since its inception and has been secretary and chairman. He is already an honorary member of A.S.T.M. and of Committee D-4 on Road and Paving Materials. In 1951 he was awarded the Distinguished Service Award by the Highway Research Board of the National Research Council in recognition of his outstanding achievement in the field of highway research.

Born in Philadelphia, Penn., Mr. Goldbeck graduated from the University of Pennsylvania, Philadelphia, Penn., with a B.S. degree in civil engineering in 1906 and a C.E. degree in 1923. He became engineering director of the National Crushed Stone Association in 1925. He is also a member of the American Concrete Institute, American Institute of Mining and Metallurgical Engineers, American Road Builders Association, American Association of State Highway Officials, and many others.

Mr. Gray has been connected with N.C.S.A. since formation of its research laboratories in 1928, serving as testing engineer in charge of investigations on various uses of crushed stone. He received his degrees of B.S. in civil engineering and C.E. from George Washington University, Washington, D.C. Prior to joining the Association, Mr. Gray served at the National Bureau of Standards and the Bureau of Public Roads. He is a member of Committee C-9 on Concrete and Concrete Aggregates, A.S.T.M.

### Heads Flexicore Association

CHARLES V. HARKER, president of Mid-State Concrete Products Co., Beloit, Wis., has been elected president of the Flexicore Manufacturers Association. He has been vice-president for the past two years. The association is made up of Flexicore manufacturers in the United States, the Philippines, Puerto Rico and Canada, and promotes the use of Flexicore precast concrete slab construction for floors and roofs.

### Bradford Hills Manager

JOHN F. CIBULA has been appointed production manager for all quarry operations of Bradford Hills Quarry, Inc., East Petersburg, Penn. These quarries are at Newport, Lititz, Morgantown, Oxford, Downingtown and Norristown, Penn. Mr. Cibula has been plant engineer since joining the company in 1954. Previously he served for six and one-half years as plant engineer for the General Crushed Stone Co., Easton, Penn.



J. C. Kingsbury

### Heads Perlite Institute

J. C. KINGSBURY, vice-president, F. E. Schundler and Co., Inc., Joliet, Ill., has been elected president of the Perlite Institute.

### Marquette Engineer

FRED B. TRIPP has been appointed operations engineer of the Marquette Cement Manufacturing Co., Chicago, Ill. A graduate of Michigan College



Fred B. Tripp

of Mining and Technology, Houghton, Mich., with a degree in mining engineering. Mr. Tripp was formerly plant engineer and superintendent of the Petoskey Portland Cement Co., Petoskey, Mich.

### Heads Ampress Brick Firm

JOHN C. PETERSON has been elected president of the Ampress Brick Co., Inc., Des Plaines, Ill.



**Good news for cement mills ...**  
**unique *SHAFER* Bearings combine best**  
**of roller and ball to beat tough working**  
**conditions**

**Big capacity plus wear adjustment  
and positive seal means more  
service at lower cost**

The low rolling friction of a ball with the high load-carrying capacity of a roller provides a high degree of internal self-alignment — that's what makes the Shafer Bearing tops for tough cement mill service.

The exclusive Shafer Micro-Lock adjustment has actually added as much as 30% extra service over ordinary units — saved thousands of dollars per year in replacement costs alone. With this simple adjustment, installation is far easier — you practically eliminate faulty installation.

Another long-life feature of the Shafer Bearing is the exclusive "Z" housing seal that positively locks lubricant in ... dirt out. Bearing life under high operating speeds, temperatures or dusty conditions is materially lengthened with this seal.

Shafer housings are lightweight, yet extremely strong. Better distribution of metal in the housing provides the most efficient use of metal ... eliminates excess bulk and unnecessary weight. This compact, rugged housing has solved mounting problems on many applications where ordinary units were too heavy and cumbersome.

Besides giving you more service for your bearing dollar, Shafer units have interchangeable components that simplify parts stocking, maintenance and replacement. Shafer Bearing Division is the only bearing manufacturer that can offer you all these features.

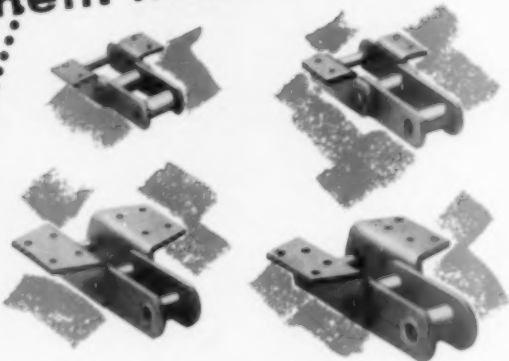


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**CHAIN BELT COMPANY**  
LEADERSHIP ... through creative engineering

# Good news for cement mills ...

## CHAIN Belt bucket elevator components meet today's high capacity demands

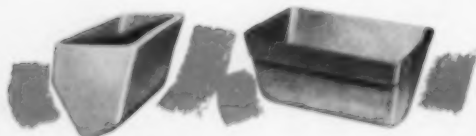


### Best chains ever designed for elevator service

To meet the needs of cement mills for increased capacity, CHAIN Belt has developed a new series of chain having greater strength and durability. These chains are a match for the industry's increased production, longer operating hours, greater capacity demands.

So strong, so durable are these chains, they outperform two-strand chain elevators on comparable installations. "Balanced" design is the secret. Each chain part is balanced against the other for strength, durability. Extra large bearing areas, too, provide longer life. And attachment length is more than generous for support and attachment of large-capacity buckets.

These chains will add additional service on any job. They will cut your costs — reduce down-time and maintenance. Your chain dollar will go further when you specify these new Rex Elevator Chains.



### Large-capacity, long-lasting buckets

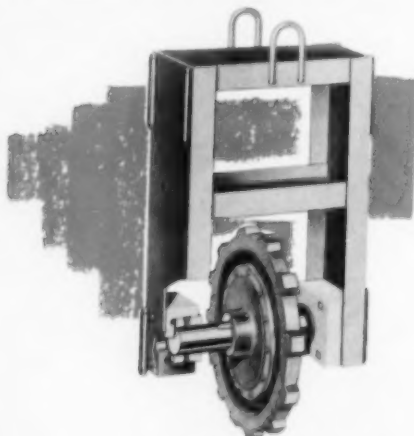
New buckets were developed to match the strength of the new chains ... buckets that hold more, are easier to load and unload. Special air vents in the AC bucket prevent trapping and permit fast charging and discharging of fluffy, aerated materials. Tough, long-lasting Rex Malleable Iron is used to give longer service in tough cement mill work.

The hooded top of the AC bucket permits efficient discharge on continuously spaced installations. High front, too, permits greater capacity of fluffy materials. You'll handle more, better, faster with these Rex Buckets.



### Segmental rim sprockets, traction wheels keep work rolling

Besides having a tough, long-lasting rim of hardened cast steel, Rex Segmental Rim Sprockets and Traction Wheels give you the ultimate in easy installation and replacement. Rims are simply bolted to either split or solid hubs. After long wear, you replace the rim only. Down time is cut to almost nothing. Sprocket rims are machined both sides — may be reversed to give double life.



### Internal gravity take-up saves chains, sprockets, bearings

Mounted in a welded steel frame that floats freely in an upright guide inside the elevator casing, this internal gravity take-up materially lengthens the life of chains, sprockets and bearings by maintaining proper alignment of the foot shaft. Internal mounting also insures a dust-tight boot section. Special heavy-duty, heat-treated tool steel sleeves operate in white iron blocks to give longest bearing service in abrasive conditions.

For more information about Shafer Bearings or the new Rex Bucket Elevator Components, send the coupon below.

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- ☐ Send information on new Rex Bucket Elevator Components.
- ☐ Please have a CHAIN Belt District Sales Engineer call.

Name .....

Address .....

Company .....

City ..... Zone ..... State .....

**CHAIN BELT COMPANY**  
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## Heads Concrete Block Firm

WILLIAM C. HOMER has been elected president of Barnes & Cone, Inc., Syracuse, N.Y., succeeding Glenn C. Barnes, who has been named chairman of the board. Mr. Homer has served as vice-president and general manager for the past three years. A graduate of Ohio University, Athens, Ohio, Mr. Homer is vice president of the New York State Concrete Masonry Association and chairman of the New York State Architects' Home Competition Program. He is also a member of the Industrial Relations Policy Committee of the Manufacturers Association of Syracuse.

## Marietta Treasurer Resigns

C. KENNETH SMITH has resigned as treasurer and director of The Marietta Concrete Corp., Marietta, Ohio, to devote full time to his public accounting practice. He is a partner in the accounting firm of Smith, Robinson & Co. Frank L. Christy, president, was re-elected treasurer, which position he held with the presidency prior to Mr. Smith's appointment in 1952.

## Assistant Plant Manager

EDMUND L. MENGEL, industrial engineer at the Waco, Texas, plant of Universal Atlas Cement Co., New York, N. Y., has been appointed assistant plant manager at the Hannibal, Mo., plant. He succeeds Mike M. Henning who was recently appointed plant manager at Hannibal. Mr. Mengel is a native of Davenport, Iowa,



Edmund L. Mengel

and was attending St. Ambrose College, Davenport, when he entered the U. S. Army in 1943, serving for three years. From 1946 to 1949, he attended the Missouri School of Mines, Rolla, Mo., where he received a B.S. degree

in mechanical engineering. He joined Universal Atlas in 1949 as an engineering trainee at the Hannibal plant.

## OBITUARIES

JOHN CURTIN, SR., Bellefonte, Penn., retired supervisor of office sales for Warner Co., Philadelphia, Penn., and father of John Curtin, Jr., president of the company, and of William and Robert Curtin of the western division sales department, died April 16. He was 77 years old and had been retired since 1950, after serving for 27 years. Born in Curtin, Penn., he attended Bellefonte Academy and Pennsylvania State University. He joined the sales department of Warner Co. in 1922 and subsequently became assistant sales manager and supervisor of office sales. In 1945 he served as president of the Pennsylvania Stone Producers Association, Harrisburg, Penn.

CHARLES VALENTINE BERRY, owner and founder of Precast Industries, Kalamazoo, Mich., formerly Kalamazoo Haydite Tile Co., died June 11 after a week's illness. He was 55 years old. Born in South Bend, Ind., Mr. Berry attended the U. S. Military Academy at West Point and also Kalamazoo College. Following graduation from the University of Michigan, Ann Arbor, Mich., with a degree in civil engineering, he joined the Detroit Bureau of Governmental Research as assistant engineer. In 1925 he organized the Kalamazoo Haydite Tile Co.

ROY NEWTON McCANDLESS, president of the Turner Gravel Co., San Antonio, Texas, died May 11. He was 61 years old. A past-president and director of the American Concrete Institute, Detroit, Mich., Mr. McCandless was also a member of the National Concrete Masonry Association, Chicago, Ill., and the National Ready Mixed Concrete Association, Washington, D. C.

WILLIAM M. LITTLE, retired president of Willingham-Little Stone Co., Atlanta, Ga., passed away June 19 in Charlotte, N. C., where he had moved about one year ago. He was 89 years of age. Born in Richmond County, N. C., Mr. Little was a graduate of the University of North Carolina, Chapel Hill, N. C.

CHARLES-VICTOR TRIEF, well known internationally for his development of the Trief cement process, died May 17 in Brussels, Belgium. He was 73 years old. An article describing the Trief

cement process and its use in concrete for dams and bridges was published in ROCK PRODUCTS, June, 1956, p. 96.

HARRY MESHBERGER, president, Meshberger Stone Co., Inc., Columbus, Ind., died May 29 following a lengthy illness. He was 68 years old. Mr. Meshberger and a brother, the late Oscar Meshberger, founded the stone company in 1937 and he became sole owner in 1946.

WILLIAM H. THOMAS, retired superintendent of the Ragland, Ala., plant of the National Cement Co., Birmingham, Ala., died May 21. He was 74 years of age. Mr. Thomas had continued as consultant for the company following his retirement.

J. P. FEISER, vice-president, LeGore Lime Co., LeGore, Md., passed away April 22 after a long illness. He had been active in the National Lime Association, Washington, D. C., for 40 years, and for many years had served as director.

GROVER C. BEITER, vice-president and manager of J. C. White Concrete Co., Des Moines, Iowa, died suddenly on June 25. He was 69 years old and a graduate of Iowa State College, Ames, Iowa, with a degree in civil engineering.

JOHN J. CLEARY, vice-president of the Sand Products Corp., Cleveland, Ohio, died June 14 at the age of 66. Born in Oswego, N. Y., Mr. Cleary moved to Cleveland in 1925. He had been associated with the firm for 30 years.

AUGUST N. FARMER, treasurer and one of the founders of the Sand Products Corp., Cleveland, Ohio, died June 23 at the age of 84. His son, Sterling N. Farmer, is vice-president of the firm.

HARRY W. LEGORE, president of the LeGore Lime Co., LeGore, Md., which was founded by his father, died June 9 at the age of 62. He was a graduate of Yale University, New Haven, Conn.

TIMOTHY CURTIN, owner since 1926 of the Curtin Bros. Mason Material and Ready Mixed Concrete Co., Little Ferry, N. J., died June 8. He was 61 years old.

ORA C. HUBBARD, former advertising and sales manager for the Medusa Portland Cement Co., Milwaukee, Wis., died June 5. He was 80 years old.



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This dependable line of heavy machinery has long been recognized throughout the cement, aggregate and construction industries for maximum, continuous production of big tonnages at lowest possible cost . . . including Symons® Gyratory and Cone Crushers for primary and fine reduction crushing; Symons Vibrating Grizzlies and Screens for scalping and sizing; Grinding Mills for wet and dry grinding; Kilns and Coolers; and a complete line of Nordberg Engines from 10 to over 12,000 horsepower to meet practically all power requirements.

*Write for literature on the Nordberg Machinery you need to efficiently produce large tonnages of quality cement, aggregate and sand to meet the most rigid specifications.*

**NORDBERG MFG. CO., Milwaukee, Wis.**

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Typical of today's modern highway construction is this view of the new Freeway in Oakland, Calif., showing 3 levels of highway structure over 2 levels of railroad. (Photo courtesy California Division of Highways)

**SYMONS . . . A Registered Nordberg Trademark known throughout the world.**



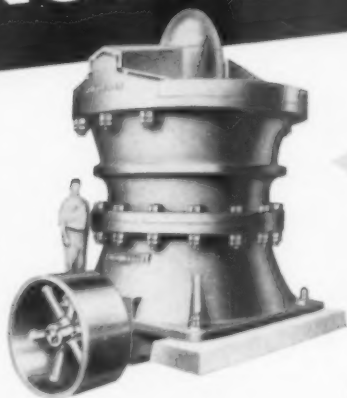
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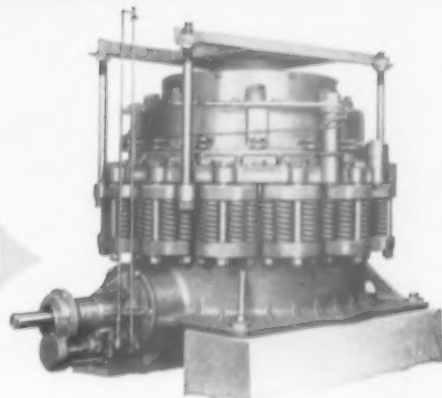
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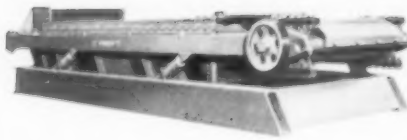
Gyratory crushers built in sizes from 30" to 72" feed openings, for capacities up to 3500 or more tons per hour.

Cone crushers built in Standard, Short Head and Intermediate types, in sizes from 22" to 7', in capacities from 6 to 900 or more tons per hour.



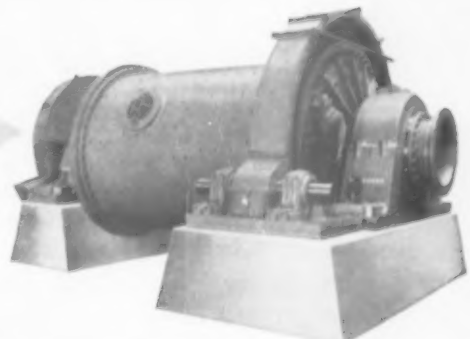
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Built in a wide range of types and sizes to meet practically all requirements from heavy scalping to fine screening applications.



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Include ball, pebble, tube, rod and compartment types for wet or dry, open or closed circuit operation. Sizes to 13' diameter and up to 50' long.

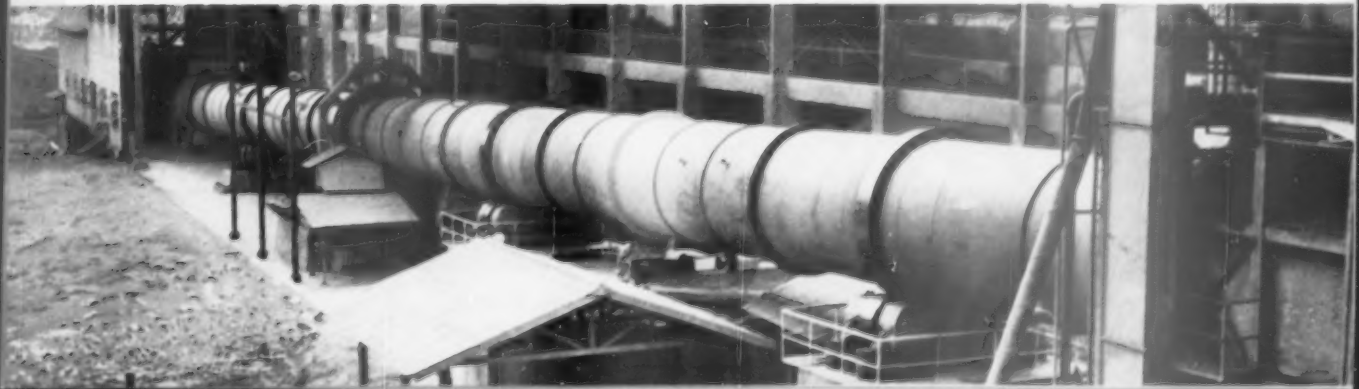
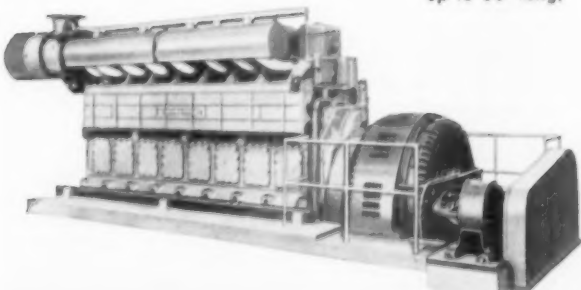


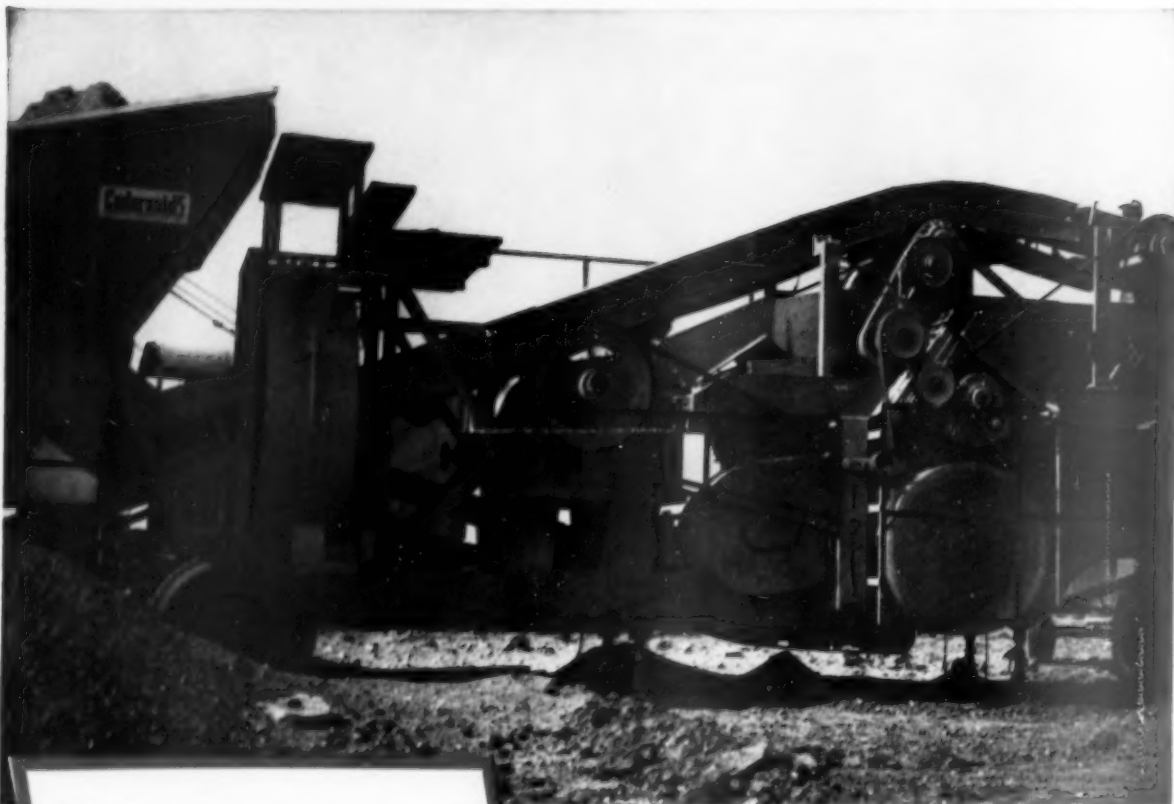
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Built in a wide range of sizes from 10 to over 12,000 horsepower, including Diesel, Duafuel® and Spark-Ignition Gas types for low cost power generation.

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Texaco to all  
our customers"**

... Boyd Tittsworth, Field Service Engineer,  
Iowa Manufacturing Company,  
Cedar Rapids, Iowa

"We have been using Texaco for more than twenty years," says Mr. Tittsworth. "Instruction plates on all 'Cedarapids' crushers, screens, driers, hammermills and other heavy duty equipment recommend Texaco exclusively."

"Texaco Marfak, for example, has always done an outstandingly fine job. Our long experience shows it to be the best lubricant for the heavy duty service, shock loads and high temperatures our equipment often meets on the job. That's why every piece of 'Cedarapids' equipment is Marfak-lubricated when it leaves our plant."

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everywhere — that *Texaco Marfak* really stays in the bearings and gives the tough, long-lasting protection that heavy duty equipment must have. And that is why —

**More than 625 million pounds of Texaco  
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Let a Texaco Lubrication Engineer give you full details and develop a Texaco Simplified Lubrication Plan for you. This will enable you to handle *all* major lubrication with *no more than six* Texaco products.

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**Texaco Marfak Heavy Duty** — for wheel bearings — assures extra thousands of miles of protection because it seals out dirt and moisture, seals itself in. You enjoy longer bearing life, lower maintenance costs. No seasonal change required.

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**TEXACO Lubricants and Fuels**  
FOR ALL CONTRACTORS' EQUIPMENT

# INDUSTRY NEWS

## Cover Picture

THIS MONTH'S COVER ILLUSTRATION shows the electrical precipitator dust collection system and stacks of the



Mojave plant of California Portland Cement Co., Creal, Calif. This \$12,000,000 cement plant has been made as dust-free as possible. When three additional kilns have been in-

stalled, capacity will be boosted to 17,500 bbl. per day. Stone is mined from two deposits at elevations higher than the plant. Each of the present two rotary kilns is 11- x 12- x 350-ft. The 7- x 41-ft. coolers are the grate-type. Natural gas is used for fuel and the kiln dust from the Multiclones and electrical precipitators is returned to the kiln feed screw.

## Ontario's New Cement Plant

LAKE ONTARIO PORTLAND CEMENT Co., Ltd., Picton, Ont., organized under Canadian law in April, plans to build a \$16½ million portland cement plant and storage facilities at Picton, and to construct additional storage facilities in the Rochester, N. Y., area.

A registration statement was filed with the Securities and Exchange Commission for \$6,497,400 of 5½ percent debentures due June 30, 1971; 232,000 shares (\$2,320,000) of \$10 par 5 percent convertible preferred stock, and 696,150 shares of \$1 par common stock. (All prices are expressed in Canadian currency.)

A permanent slate of directors and officers has been elected, with William A. Fraser of Trenton, Ont., as president. The company anticipates an initial capacity of 1,650,000 bbl. of cement and 600,000 tons of commercial aggregate annually.

## Gypsum Plant Opens

UNITED STATES GYPSUM Co., Chicago, Ill., has officially opened its new plant in New Orleans, the first plant in Louisiana to supply gypsum products. Building materials for an estimated 30,000 houses will be turned out an-

nually by the plant, said H. F. Swaney, manager. Sheathing, wallboard, plaster base and plaster are being produced for the Mid-South market. The new plant covers more than 21 acres.

## Stauffer Acquires Interest In Phosphate Rock Concern

STAUFFER CHEMICAL Co., New York, N.Y., has announced its purchase of a 50-percent interest in the San Francisco Chemical Co. from the latter's parent organization, The Mountain Copper Co., Ltd. of London, England. San Francisco Chemical, a pioneer mining concern in the Rocky Mountain area, has been for several years Stauffer's primary supplier of phosphate rock. It operates its own mine at Montpelier, Idaho, and also mines a Stauffer-owned claim in Southwestern Wyoming, in addition to conducting a development program on Stauffer claims and leases near Hot Springs, Idaho. Other deposits are leased by San Francisco Chemical Co. in the Crawford Mountains of Utah.

San Francisco Chemical Co. supplies phosphate rock to Stauffer's phosphate fertilizer plants at Tacoma, Wash.; Richmond, Calif.; and Vernon (Los Angeles), Calif. It also sells phosphate rock to Western Phosphate's Inc. at Garfield, Utah, which is 50-percent owned by Stauffer.

## Potash, Borax Firms Merge

POTASH COAST BORAX Co., Los Angeles, Cal., and United States Potash Co., Carlsbad, N. M., have agreed on a merger. The name of the new firm will be the United States Borax and Chemical Corp., according to an announcement by the presidents of the two companies, James M. Gerstley and Horace M. Albright, respectively. Pacific Coast Borax is the American affiliate of Borax (holdings) Ltd., London.

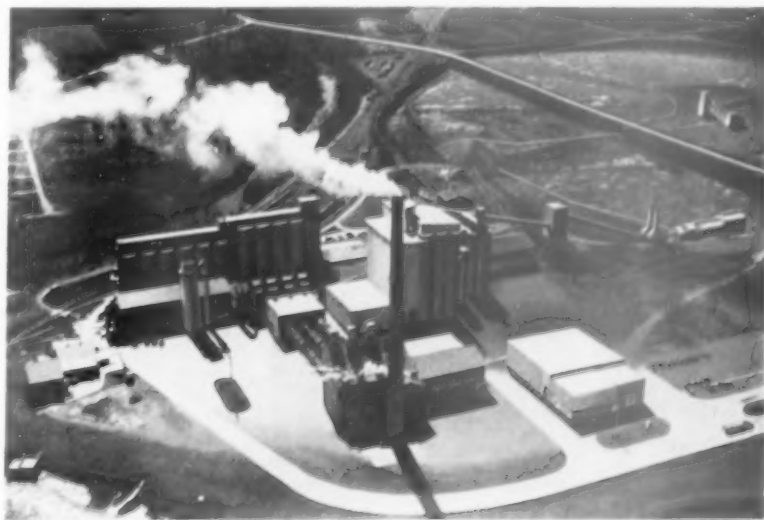
## Monarch Cement Tells Expansion Plans

MONARCH CEMENT Co., Humboldt, Kan., has announced a \$6½ million expansion program which, when complete in 1957, will increase plant capacity by more than 50 percent, from 1,500,000 bbl. of cement annually to more than 2,250,000 bbl.

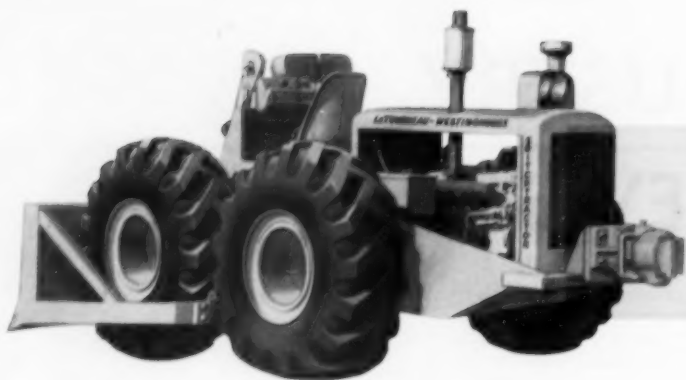
A crushing plant to be installed in the Monarch quarry will process 450 t.p.h. of limestone. A single-burner drying chamber, one of the largest ever constructed, will be used in a new technique of "flash drying" moisture from the shale and clay. It will use 150,000,000 B.t.u.'s per hour.

Two new 10- x 15-ft. raw grinding mills will be powered by 850-hp. elec-

(Continued on page 43)



Additions now being made at the Monarch Cement Co.'s plant in Humboldt, Kan., are shown in this retouched photograph of the present plant



**new switch  
for old rig!**

# SwitchTractor

**Now . . . time-tested Tournatractor**



When not needed for spotting or hauling rail-cars, fast-moving, double-duty SwitchTractor drives anywhere around pit or plant on dozing, maintenance, and clean-up chores.

Ten years' hard use has improved and perfected the fast, rubber-tired performance of this work-and-run Tournatractor. Thousands of these machines have proved their value in dozing, hauling, pushing, grading, scarifying, compacting, and snowplowing in practically every country of the world. Each year has seen many major improvements. Wherever speed and maneuverability are needed, these fast-moving rigs have given outstanding service.

## **Doubles value of Tournatractor**

Now — with new *SwitchTractor* application — this versatile unit gives you added utility. Equipped with a standard railway coupler at the rear, SwitchTractor does double-duty on your location . . . switches freight cars on your siding, yard, or pit at a moment's notice. Rig has plenty of power and traction to pull and spot long trains of cars as needed, saving time and money.

SwitchTractor often eliminates the need for maintaining private switch engines and engineers . . . saves charges and delays for RR switch service. Your single SwitchTractor and operator may well handle all your scattered tractor-dozzer work — plus whatever freight-





#### **New double-duty SwitchTractor**

Famous high-speed work-and-run tractor now available with standard railroad coupling attachment. Makes rig even more versatile . . . gives you the plus value of a go-anywhere off-track switcher for hauling and spotting cars on your sidings, yard, or pit.

## **also spots and switches freight cars**

car switching is required! Highly maneuverable in close quarters, unit turns around in its own length.

#### **Off-track travel cuts switching time**

SwitchTractor gives you several important advantages. Rolling on big, low-pressure rubber tires, this go-anywhere rig always takes the shortest route to every switching or hauling assignment. No matter where it happens to be working, unit easily highballs across yards, fields, tracks, ties, ditches, embankments to its next assignment — without damage to machine or roadbed. In hauling cars, it straddles tracks . . . does not chamfer ties or damage switches.

Depending on the distance and number of cars to be spotted or hauled, SwitchTractor can either push (with its dozer or push-plate), or pull with its drawbar. Coupling to cars with drawbar at rear takes but a moment. Coupler is safe, sturdy, standard RR type.

#### **60% vs 30% coefficient of friction**

Rolling on big rubber tires over ballast and ties, instead of with steel wheels on steel rails, SwitchTractor develops much more coefficient of friction (60% compared to 30%) than track locomotives of *twice* its weight. That means you have plenty of tractive power for fast starts and stiff rail grades in hauling cars. When not needed for handling cars on your pit or yard tracks, SwitchTractor keeps working productively for you as a dozer or towing tractor.

#### **Worthwhile savings with SwitchTractor**

If you have freight cars to move on your siding, yard, or pit, the added versatility of this new SwitchTractor will really pay off for you. Get all the facts on how this coupling-equipped go-anywhere tractor can save thousands of dollars for you in equipment investments and manpower economies. Phone or write us for details and a demonstration in handling *your* type of work.

SwitchTractor—Trademark, Teurnatractor—Trademark Reg. U.S. Pat. Off. ST-1075-M

**LeTourneau-WESTINGHOUSE Company**

Peoria, Illinois

A Subsidiary of Westinghouse Air Brake Company





## A rugged answer to any tough **6-WHEEL DRIVE** problem

Here's a reliable guarantee of a long, useful, profitable life for a hard-working 6 x 6 vehicle—this husky combination:

- a Clark steering-drive axle for the front
- two Clark non-steer drive axles in tandem at the rear

These are true heavy-duty units—amply strong to carry tremendous loads, ruggedly built to deliver torque to the wheels with dependable efficiency.

Always, wherever you find it, this is a "Quality Specification" . . . CLARK AXLES.

Are you constantly studying how to increase efficiency and decrease costs in that vital area between fly-wheel and tires? Talk to Clark: for in that "vital area" is where Clark can help you; a fact well known to a number of leading equipment manufacturers—to their profit.

# CLARK<sup>®</sup> EQUIPMENT

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As a practical Step 1, send for the handy, pocket-size Clark Products book—for a clear idea of why it's "good business to do business with Clark."

**CLARK EQUIPMENT COMPANY, Buchanan, Michigan**

OTHER PRODUCTS OF THE CLARK AUTOMOTIVE DIVISION—  
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BUSES and OFF-HIGHWAY EQUIPMENT.

tric motors, imported from Denmark, with heavy-duty precision marine bevel gears. Three new 11- x 230-ft. rotary kilns have been installed, two of which already are in use. A waste heat boiler will be installed and additional equipment includes two new 10- x 28-ft. finish mills. A laboratory building is also included in the expansion program.

Monarch's engineering department is planning for the expansion; MacDonald Engineering Co., Chicago, has charge of general plant layout and is the general contractor.

## Everglades Plant Proposed by Lehigh

LEHIGH PORTLAND CEMENT CO., Allentown, Penn., has chosen the Everglades section of Florida for its newest cement plant. It will be located 7 miles west of the Miami International Airport and 2 miles north of the Tamiami Trail. Rock will be reclaimed by draglines from the 3000-acre tract, already acquired.

The new plant is expected to cost more than \$20 million, and will produce 2,000,000 bbl. of portland cement annually. It will be designed under the supervision of F. L. Smidth & Co. and will allow for future expansion.

This plant will be Lehigh's second in Florida, and its 15th in all. At present, the total annual capacity of all Lehigh plants is 24,500,000 bbl. When the Miami plant and other substantial expansion now in progress is completed, the company's annual capacity will be in excess of 30,000,000 bbl.

## Non-metallics Gain

DEPARTMENT OF COMMERCE, Bureau of the Census, Washington, D.C., has a report (MI-14-9-2) on production of non-metallic minerals showing tonnages three and one-half times greater than in 1939.

Preliminary results of the 1954 Mineral Census show the following gains for a 15-yr. period:

Product	1954 Production	1939 Production
Gypsum	9,057,000-ton	3,314,000-ton
Mica	927,000-lb.	27,000-lb.
Asbestos	49,000-ton	16,000-ton
Diatomite	437,000-ton	99,000-ton
Perlite	288,000-ton	NA

## Building Gravel Plant

MALVERN GRAVEL CO., Conway, Ark., plans to process sand, rock, and gravel from the Arkansas River and pits near Palarm, Ark. The firm entered into a 99-year lease with Mrs. G. W. Adkisson and her son, G. W. Adkisson, Jr., and has started construction of a plant to remove the building materials. Malvern Gravel Co. will also set up its own power plant.

struction of a plant to remove the building materials. Malvern Gravel Co. will also set up its own power plant.

## Texas Gypsum Plant Seen

THE FLINTKOTE CO., East Rutherford, N. J., will start construction soon of a gypsum materials plant at Sweetwater, Texas. I. J. Harvey, Jr., president of Flintkote, announced the company's purchase of a large deposit of gypsum at the Texas site, and said that installation is expected to be complete in 1957. A spur from the nearby Santa Fe Railroad lines will serve the plant.

Having undertaken a \$20 million expansion program, Flintkote has acquired Insulrock Corp., manufacturer of a fire-resistant acoustical building material, and has also announced plans for a building materials plant at Ennis, Texas.

## Opens Rock Plant

HARTMAN CONCRETE MATERIALS CO., Bakersfield, Calif., has opened a new \$500,000 rock, sand and gravel plant on historic San Emidio ranch near Maricopa, Calif. The new plant, designed by Harold Fox, engineer and president of the company in collaboration with Los Angeles Conveyor Co., has an hourly capacity of 300 tons. The company's original rock-crushing plant on the same site produced 49 t.p.h. Up to 1200 tons of material can be held at one time in the new structure, which has a four-tier screening and storage tower. This is engineered to screen 10 different sizes of rock and gravel. Officers of the company, in addition to Mr. Fox, are Dick Stricklen, vice-president; Walter Kane, secretary-treasurer; and Monroe Browne and Floyd Hall, directors.

## Buys Limestone Quarry

NEW ENTERPRISE STONE & LIME CO., Inc., New Enterprise, Penn., has purchased Dry Run Stone Quarry, Dry Run, Penn., from Binkley Brothers, Inc., according to an announcement by Paul I. Detwiler, president of the New Enterprise firm.

The plant has a capacity production of 80 t.p.h. of clean graded limestone, in addition to agricultural limestone produced with two Bradley mills.

## Cement Prices Raised

LONE STAR CEMENT CO., New York, N.Y., Lehigh Portland Cement Co., Allentown, Penn., and Penn-Dixie Cement Corp., New York, N.Y., have raised cement prices 5-10¢ a

barrel at their mills in the midwest and south, effective July 1.

Lone Star's mills at Bonner Springs, Kan., and Greencastle, Ind., have upped their prices 10¢ a barrel, as have the Lehigh plants at Oglesby, Ill., Mason City, Iowa and Iola, Kan. The Lehigh plant at Mitchell, Ind., figured in the 5-cent per bbl. raise.

Penn-Dixie's prices went up 10¢ a barrel at four mills: Kingsport, Tenn., Clinchfield, Ga., Richard City, Tenn., and West Des Moines, Ia.

## Install ACL System

DIAMOND PORTLAND CEMENT CO., Middle Branch, Ohio, currently in the midst of an expansion program, will install a 3500-bbl. per day ACL system of producing cement clinker from a kiln feed in the form of pellets.

A 42- x 82-in. reversible impact crusher and two Allis-Chalmers vibrating screens will increase the capacity of the crushing section. Two 10½- x 17-ft. dry grinding ball mills will go into a new closed circuit raw grinding department. Existing raw grind mills will be converted to clinker grinding mills in the first stage of the expansion program. A completely new grinding department is planned for a later date.

Included in the 3500-bbl. per day ACL system are a 12½- x 75-ft. grate, a 12½- x 160 ft. rotary kiln, a 6- x 100-ft. air-quenching cooler, master control panel, and two 15-ft. dia. pan-type pelletizers.

## Expands Magnesite Plant

STANDARD LIME AND CEMENT CO., Baltimore, Md., has launched a major expansion program at its Manistee, Mich., magnesite plant which will double that plant's present capacity. Construction, already begun by Crosby Construction Co., Chicago, Ill., is expected to be completed by mid-June of 1957.

An additional rotary kiln, additional thickeners and settling basins, reactors and companion equipment will be included in the expansion program, as well as improved and enlarged loading facilities.

## Name Change Announced

BASIC REFRACTORIES, INC., Cleveland, Ohio, will be known in the future as Basic, Inc., since stockholders recently approved the name change. The new name is reported to denote the company's diversification into manufacture and distribution of building material products, and broader markets in glass and chemical industries.

(Continued on page 49)

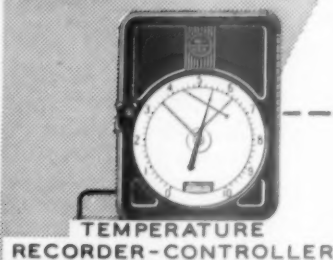
# Now! "Self-Serve" operation - Bailey Meter

Your "Self-Serve" Bailey controlled rotary kiln literally thinks for itself and reacts quickly and correctly to any changes in operating conditions. You get:

- 1. Economical Operation**—Gives maximum production from every unit of fuel you burn because Bailey Combustion Control closely guards Fuel-Air Ratio, Hood Draft, Fuel Feed, Clinker Cooling and Temperature of Air for Combustion.
- 2. Uniform High Quality of Product**—Accurate measurement and control of Kiln Speed, Burning Zone Temperature, Combustibles Content and Oxygen Content . . . for a high grade product, consistently.
- 3. Minimum Maintenance**—Uniform excess air conditions and constant temperatures *prolong the life of your kiln*. Costly refractory repairs and wear and tear on auxiliary equipment are reduced to a minimum.

The accompanying diagram shows one way in which Bailey instruments and controls can give you a "Self-Serve" Kiln. Other arrangements to suit the requirements of any rotary kiln are available.

Bailey Meter Company maintains a staff of engineers who are experts in the control of rotary kilns. Let one of these men help plan a control system to give you a "Self-Serve" rotary kiln.

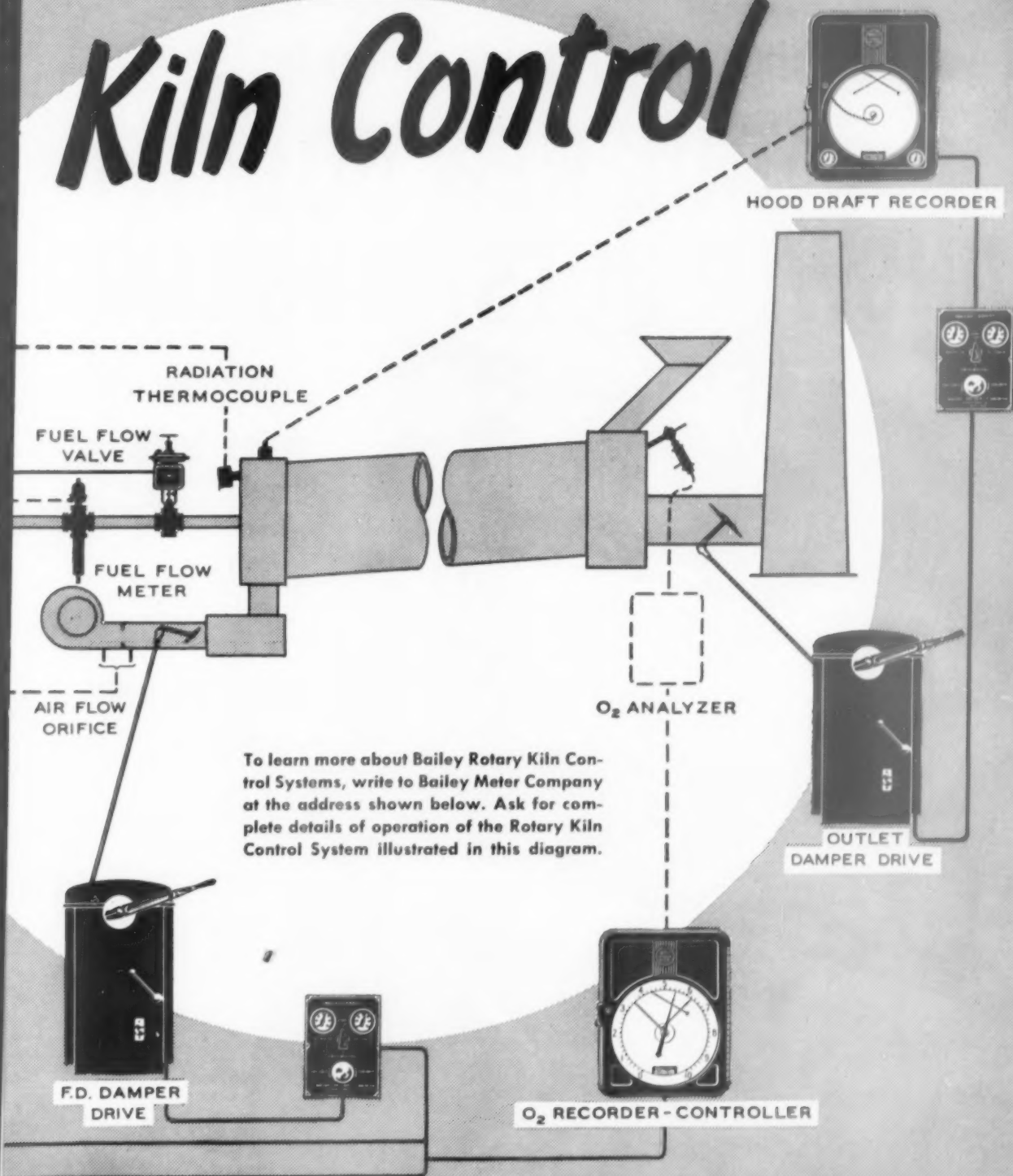


FUEL FLOW-AIR FLOW  
METER

## ■ Bailey Meter Company



# Kiln Control



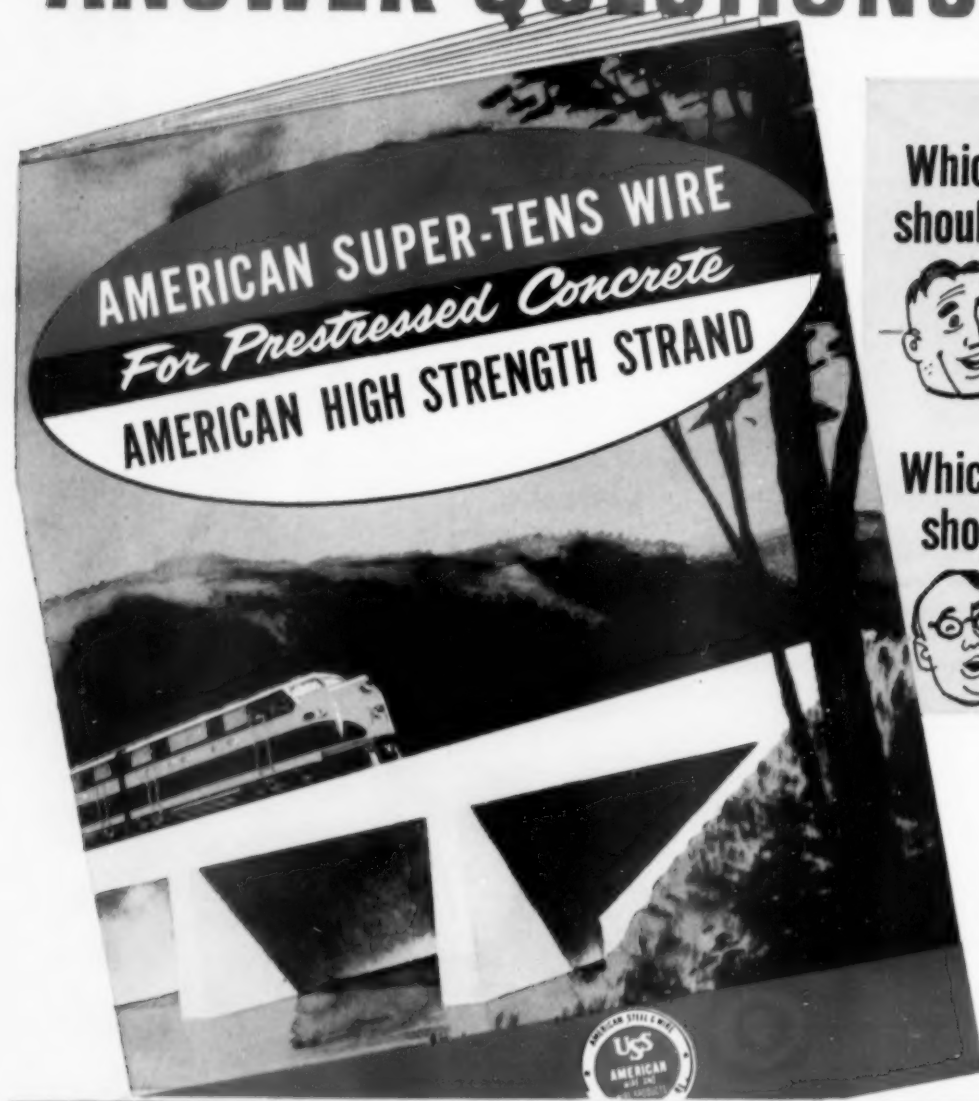
Meters and Control Systems for Process Plants

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Bailey Meter Company Limited • Montreal

If you're using prestressed concrete...

# THIS NEW BOOKLET ANSWER QUESTIONS LIKE



Which WIRE  
should I use?



Which FITTINGS  
should I use?



## USS AMERICAN *Super-Tens* WIRE & HIGH

# HELPS THESE

Which **STRAND**  
should I use?



What  
**TENSION LOAD**  
should I use?



## SEND THIS COUPON FOR A FREE COPY.

This new 16-page booklet describes the complete line of high strength wire, high strength stress-relieved strand, and end fittings manufactured by American Steel & Wire. It contains stress-strain curves, typical tensioning loads and breaking strengths for American Super-Tens Wire and American High Strength Strand—quality products that are especially made for use in prestressed concrete. Send for your copy.

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Please send your new descriptive booklet on American Super-Tens Wire and American High Strength Strand for prestressed concrete. Also send information on these other products of American Steel and Wire:

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UNITED STATES STEEL

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ROCK PRODUCTS, August, 1956

47

*To celebrate its first birthday*

# THE D9 GETS INCREASED HP

*—more power for your operation!*

## 320 HP

(FLYWHEEL)

**formerly 286 HP**

## 260 HP

(DRAWBAR)

**formerly 230 HP**



The giant Turbocharged CAT\* D9 Tractor, which since its introduction last year has set new performance standards in the field, now packs more power than ever to handle even bigger jobs. Its drawbar capacity has been increased from 230 HP to 260 HP—its flywheel horsepower from 286 to 320!

This increase in power reflects Caterpillar's policy of leadership in action. Combining research with practical field experience, there's constant product improvement to meet your needs for bigger production at lower cost. This policy applies to every product in the Caterpillar line—Diesel Engines, Tractors, Motor Graders and Earthmoving Equipment.

Now, with its increased horsepower, you can give the D9 tougher jobs than ever before. To match your requirements, it's available with torque converter or direct drive with oil clutch. For complete details about the more powerful D9, see your Caterpillar Dealer. Name the date—he'll be glad to demonstrate!

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

## CATERPILLAR\*

\*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

**D9—MORE POWERFUL  
FOR BIGGER PRODUCTION**



## Roadbuilding Gets Federal Boost in Highway Act

THE HIGHWAY ACT OF 1956, now having President Eisenhower's signature, authorizes the expenditure of \$27.7 billion in federal funds for a roadbuilding program over the next 13 years. The National Interstate System is to receive \$24.8 billion. States will match on a 90-10 formula to finance the project, making possible a superhighway network of the nation's main routes.

A schedule of the federal funds authorized for the National Interstate System is as follows:

1957* — \$1,175 million	1964 — \$2,200 million
1958 — 1,700 million	1965 — 2,200 million
1959 — 2,000 million	1966 — 2,200 million
1960 — 2,200 million	1967 — 2,200 million
1961 — 2,200 million	1968 — 1,500 million
1962 — 2,200 million	1969 — 1,025 million
1963 — 2,200 million	

\*Includes apportionment previously made under Highway Act of 1954.

## Florida Superphosphate Plant

AMERICAN CYANAMID CO., New York, N.Y., will build a 200,000-t.p.y. triple superphosphate plant at Brewster, Fla. The plant will be built on an existing Cyanamid site at Brewster where phosphate rock is mined, and is expected to be completed by mid-1957.

K. C. Towe, president, said American Cyanamid's decision to build the plant was made to keep pace with the demand from agriculture for higher analysis mixed fertilizers in which triple superphosphate provides a high percentage of available phosphorous, and to take advantage of the opportunity for up-grading the company's phosphate rock.

## Lime Recovery Plant

CONSTRUCTION PLANS of a proposed lime recovery plant have been up for approval in Dayton, Ohio, by the City Commission. The plans are for construction of a building and erection of a kiln and other specialized equipment already purchased by the city. Cost of the building has been estimated at \$1,479,692. The equipment cost \$465,305. The plant would reclaim lime used to soften Dayton water as well as the lime that is in the water naturally. Surplus lime would be sold. Consultants for the project are Black and Associates of Gainesville, Fla.

## Four Firms Merge

THE TRIANGLE ROCK AND GRAVEL CO., San Bernardino, Calif., has been sold to a newly-formed corporation, it was announced recently. Included in the sale were affiliated companies of Triangle Certified Concrete Inc., Baker-Mitchell-Thwing Co. and Fon-

tana Gravel Co., firms which have operated in Southern California for many years.

The four firms will be merged under the name of Triangle Rock Products Inc.

## Two-Plant Expansion

CONSOLIDATED CEMENT CORP., Chicago, Ill., has completed the expansion program at its Fredonia, Kans., plant, and is nearing comple-

tion of a new plant at Paulding, Ohio. New grinding and auxiliary facilities have been added at Fredonia. A new 525-ft. kiln was placed in operation. Annual capacity has been increased by approximately 1,300,000 bbl. of cement.

The Paulding plant, a multi-million-dollar project, includes 14 cement silos. Overall length of the plant is 1200 ft., and width ranges from 40 to 400-ft. Annual capacity will be 1,250,000 bbl. of cement.

## Coming Conventions

September 9-16, 1956—

American Concrete Pipe Association, Executive Committee Meeting, The Cloister Hotel, Sea Island, Ga.

September 26-28, 1956—

Rocky Mountain Minerals Conference, A.I.M.E., Third Annual Conference, Newhouse Hotel, Salt Lake City, Utah.

October 1-4, 1956—

American Mining Congress, Metal Mining and Industrial Minerals Convention, Shrine Exposition Hall, Los Angeles, Calif.

October 10-12, 1956—

National Lime Association, Operating Meeting, Kentwood Arms, Springfield, Mo.

October 17-19, 1956—

National Industrial Sand Association, Fall Meeting, The Greenbrier, White Sulphur Springs, W. Va.

October 22-26, 1956—

National Safety Congress and Exposition, Conrad Hilton, Congress, Morrison and LaSalle Hotels, Chicago, Ill.

November 12-19, 1956—

American Concrete Pressure Pipe Association, 8th Annual Convention, Castle Harbour Hotel, Tucker's Town, Bermuda.

January 15-17, 1957—

National Crushed Stone Association, 40th Annual Convention, American Hotel, Miami Beach, Fla.

January 28—

February 2, 1957—

American Road Builders' Association, Convention and Road Show, National Amphitheater, Chicago, Ill.

February 11-14, 1957—

National Sand and Gravel Association, 41st Annual Convention, Statler Hotel, Los Angeles, Calif.

February 11-14, 1957—

National Ready Mixed Concrete Association, 27th Annual Convention, Statler Hotel, Los Angeles, Calif.

February 25-28, 1957—

National Concrete Masonry Association, Annual Meeting and Exposition, Hotel Jefferson, St. Louis, Mo. Exhibit at Kiel Auditorium.

Completed in 1954, this Research-Cottrell precipitator cleans the gases from Kiln No. 5 of Missouri Portland's Prospect Hill Plant. The gases from this rotary wet process kiln pass from the kiln end housing, through the precipitator, induced draft fan and then up the stack.

Rapping puffs were eliminated in this installation with Research-Cottrell's electronically controlled M. I. Rappers. This method of continuous, sequential rapping avoids dust re-entrainment in the gas stream and assures optimum precipitator performance at all times.

# **Research-Cottrell**

# **Precipitator**

## *at Missouri Portland*

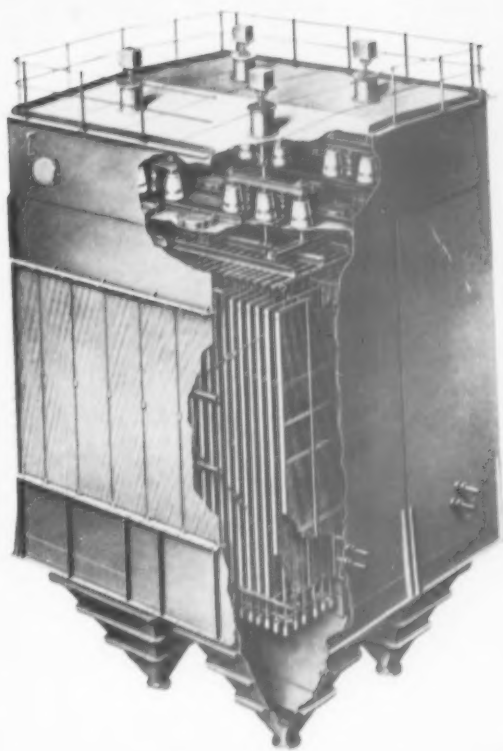
In addition to this installation, Missouri Portland has ordered three more Research-Cottrell precipitators. One, installed early this year, cleans the gases from Prospect Hill's 12' x 450' wet process kiln.

Two other units have been ordered for two dry process kilns at the Sugar Creek Plant, Kansas City, Mo. M. I. Rappers will be included on all these installations.

For a detailed description of Research-Cottrell precipitators and their applications in the cement industry, write for Bulletin GB.



At Left:  
Shows Research-Cottrell  
precipitator, connecting  
flues and stack. Cement  
block building in foreground  
at right is substation which  
contains two half-wave  
rectifier sets and M. I.  
Rapper control equipment.



At Right:  
Cutaway drawing of the  
Research-Cottrell expanded  
metal plate precipitator  
installed at Prospect Hill  
Plant of Missouri Portland  
Cement Co.

# Research-Cottrell, Inc.

Main Office and Plant: Bound Brook, New Jersey • 405 Lexington Ave., New York 17, N. Y.  
Grant Building, Pittsburgh 19, Penna., 226 No. La Salle St., Chicago 1, Ill. • 111 Sutter Bldg., San Francisco 4, Cal.

# TIMKEN® multi-use bits give Oman Construction Co. lowest cost per foot of hole in drilling limestone

**CARBIDE INSERT?  
or  
MULTI-USE?**

**I**N wagon drilling limestone on a 232-acre plant site in Nashville, Tennessee, Oman Construction Company got the lowest cost per foot of hole by using Timken® multi-use rock bits.

You can get similar savings with Timken multi-use bits. With correct and controlled reconditioning, they give the lowest cost per foot of hole when full increments of steel can be drilled in ordinary ground.

But multi-use bits may not be best for all drilling conditions. When you drill in hard, abrasive ground, Timken carbide insert bits are your best bet. With them you get higher speeds and greater economy on extremely deep hole, constant-gauge hole or small diameter blast hole work.

And your drillers save time changing bits when using Timken multi-use and carbide insert bits. They're interchangeable in the same thread series. Dozens of different Timken bits fit the same drill steel. They can be changed quickly and easily as the ground changes. Right on the job.

What's more, Timken rock bits give you these extra advantages: 1) they're made from the Timken Company's own electric furnace fine alloy steel; 2) they have special shoulder unions developed by the Timken Company that protect threads from drilling impact. Let us help you select the best type of bit for your jobs—cut your drilling costs. Write: The Timken Roller Bearing Company, Rock Bit Division, Canton 6, Ohio. Cable address: "TIMROSCO".

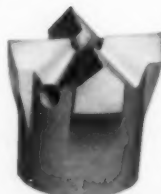
**LOCATION:** Industrial plant site, Nashville, Tenn.

**DRILLING CONDITIONS:** Medium hard limestone.

# TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

**your best bet for the best bit for every job**



Timken threaded multi-use rock bit



Timken threaded carbide insert rock bit

Enter 1036 on Reader Card



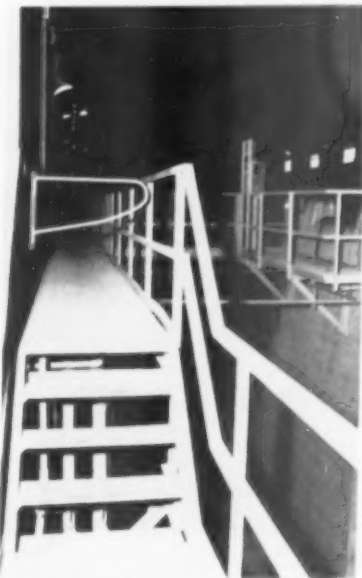
# HINTS

## AND HELPS

PROFIT-MAKING IDEAS DEVELOPED BY OPERATING MEN

### Safety Gates

AT THE FT. WHYTE, MAN., PLANT of Canada Cement Co., the walkway alongside the 12- x 450-ft. rotary kiln



**Warning gates** are placed at points along walkway where steps are located

is safe-guarded by gates, shown in the illustration, where steps are located. Several of these gates are used at these points. They are not designed to be locked but merely serve as warnings to workmen that they are approaching steps.

### Sampler

AN EFFICIENT SAMPLING DEVICE for aggregates has been devised by Concrete Materials and Construction Co. for its new Eskridge, Kan., crushed stone plant. The sample is taken from a collecting-discharge hopper attached at the head end of a 36-in. collector conveyor and ahead of a 36-in. radial stacker conveyor. The sampler consists of a steel box, measuring 24 in. long x 6 in. wide x 8 in. deep, which is slipped onto the end of a 7-ft. swinging arm. It is swung rapidly across the entire cross-section of the chute (24- x 24-in. opening) in order to obtain a representative sample. The swinging arm was built by welding two channel frames together to form a box beam. The sampler is fitted with



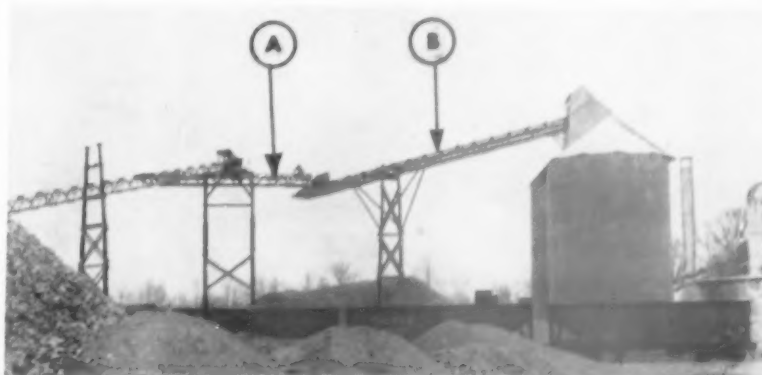
**Sampling device** is swung across discharge opening of hopper

handles to facilitate lifting. Two men are required to swing the sampler through the stream of material, which is flowing at a 1000 t.p.h. rate.

### Two-Way Belt Conveyor

A CRUSHED STONE PRODUCER supplies aggregate to an adjacent bituminous mix plant. This bituminous paving plant is owned by another company. An ingenious belt conveyor arrangement was set up to take care of the crushed stone company's requirements and also serve the paving plant.

The crushed stone company has a reclaiming belt conveyor operating in a tunnel under the stockpiles which is reversible and normally loads cars and trucks. Reversing the belt conveyor delivers stone to a short pendulum belt conveyor marked "A". This belt can be swung over belt conveyor "B", and the stone is delivered to the silos of the paving company or belt "A" can drop the stone to ground storage on the property of this company.



**Belt conveyor system** serving paving company permits ground storage or bin storage

### Concrete Floor System With Built-In Electrical Conduits

A PRECAST CONCRETE FLOOR SYSTEM with underfloor electrical distribution for office buildings has been announced by The Flexicore Co., Inc.,



**Cut-away view** showing how electrical system is installed in precast concrete floor units

Dayton, Ohio and The Conduffor Corp., Buffalo, N. Y. This system uses the hollow cells in Flexicore floors as electric raceways and provides electrical floor outlet spacing as close as 5 1/2 in. It also permits the installation of new outlets at any time in the future at nearly any location on the floor.

To carry the power lines, the floor incorporates metal feeder ducts installed on top of the structural floor in a 1 1/2-in. concrete fill. These ducts

(Continued on page 57)



## **"New Bonus-Powered International<sup>®</sup> gives work-speeding capacity... new**

**Eighteen tons of shot-rock** ride fast from pit to crusher in the "room-sized" body of this new International Payhauler<sup>®</sup> — for a Virginia limestone quarry operator.

These huge new off-highway haulers are built for speedy rock and ore transport over rough terrain. An

"No busy season downtime," says Ralph Jordan, crusher superintendent, Asphalt Paving Company, Wheatridge, Colorado — of International Power Unit performance. "I prefer Internationals—they're easiest to maintain." A Model U-450 powers their hot-mix plant and a UD-1091 powers the crusher with a capacity of 1,500 tons of gravel daily!

International Payhauler has more turbo-charged diesel hp per struck yard, greater frame strength and shock-protection, than any other same-sized hauler!

Both the 18-ton Model 65, and 24-ton Model 95, are power-steered, and power-dumped, with top operating comfort.

**Five yards of sand every 90 seconds** is the loading rate for Lynch Gravel Co., Detroit, with this new bonus-powered TD-9 Skid-Shovel. Exclusive 41" bucket roll-back and non-spill level-lift action help heap the bucket and "keep the heap."





**In a large open pit copper mine** this TD-24 levels rock "spoil" to aid low-cost disposal. These "rock-busters" open new levels, bench-out access roads, move railroad track, clean up after blasting. "Live" turning power on both tracks with exclusive Planet Power steering, gives amazing tough job control!



**Bowl-boiling action, turbo-charged diesel power** back International Payscraper production of 3.7 loads per hour on 1.8 mile cycle—uncovering Indiana limestone. Heap-loaded in 30 to 44 seconds, in 50 to 75 feet, "pushed" by TD-24, the Payscraper takes off in "high!"



**A key manganese producer** strips 25 feet of overburden from a rich ore deposit—with new bonus-powered International crawler-dozzer outfit—helping maintain 1200-ton ore production per 8-hour day. "Tough work, and the International equipment has performed and held up very satisfactorily," reports the mining company.



**Opening a cut 100-120 feet wide**, this TD-24 dozes its loads 150-175 feet, exposing a 32-ft. limestone ledge at Mulzer Brothers Quarry, Tell City, Ind. Planet-Power steering often enables the TD-24 to operate a gear faster than rival crawlers on heavy dozing!



## Equipment... operating ease!"

Prove how a Payhauler can increase your production, give new cost-control.

Ask for a demonstration of the International equipment you need!

See you at  
the ROAD SHOW—CHICAGO  
Jan. 27 to Feb. 4, 1957

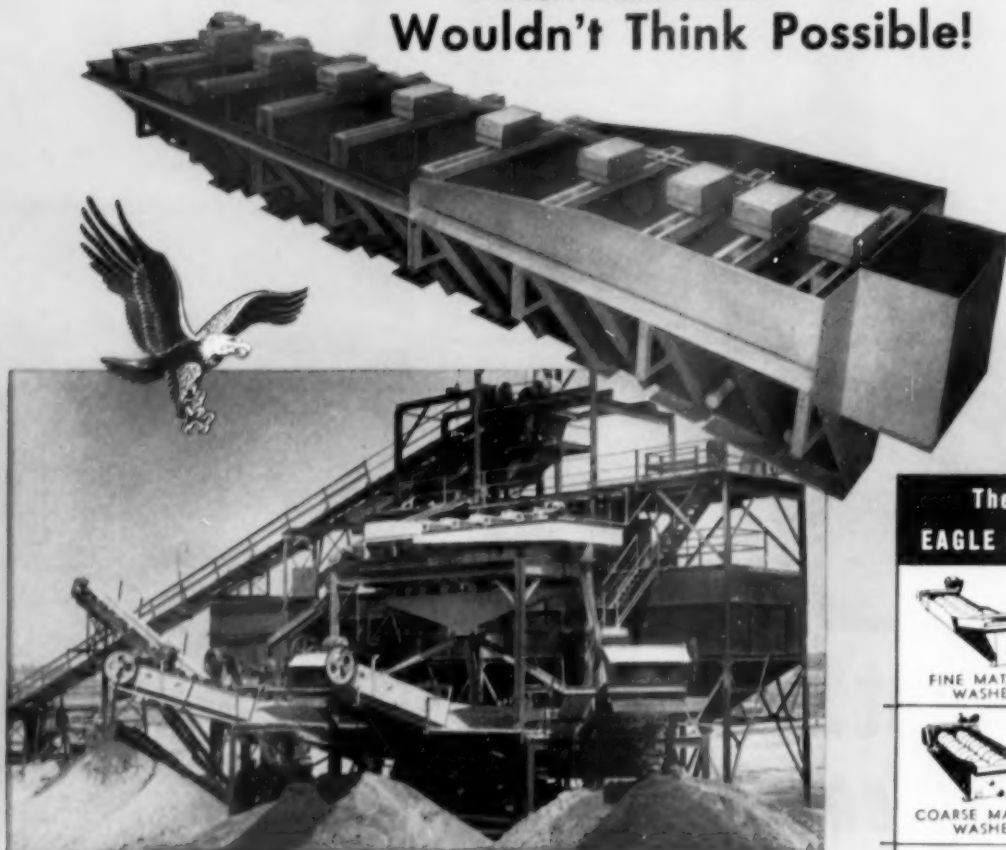


# INTERNATIONAL Construction Equipment

International Harvester Company, 180 N. Michigan Avenue, Chicago 1, Illinois

A COMPLETE POWER PACKAGE INCLUDING: Crawler, Wheel, and Pipe-Boom Tractors . . . Self-Propelled Scrapers and Bottom-Dumps . . . Crawler and Rubber-Tired Loaders . . . Off-Highway Trucks . . . Diesel and Carbureted Engines . . . Motor Trucks

# The EAGLE Water Scalping-Classifying Tank Gives You Classification You Wouldn't Think Possible!



**T**HE EAGLE Complete Washing-Classifying-Dehydrating Section at the eastern aggregate plant shown, has a 24' tank equipped with 9 automatic, power-operated bleeder valves. Pit run sand is segregated into 9 distinct classifications, each flowing from one of the 9 valves. "Splitter" gates below each valve, in conjunction with the Multi-Cell Collecting-Blending Flume below the tank, permit directing of any percentage from each valve to any of the three Eagle Screw Washer-Classifier-Dehydrators. Or, any percentage from any valve can be wasted. Complete flexibility to produce any gradation—or variety of gradations—material to meet specifications.

You can increase the efficiency of your present Eagle Fine Material Washer or Washers—or other make—by installing an Eagle Water Scalping-Classifying Tank—whether yours is a dry pit operation, as shown, or a pumping operation. Send for the facts in Catalog 55.

EXPERIENCE, PROGRESS, SERVICE SINCE 1872

## EAGLE IRON WORKS

137 HOLCOMB AVE., DES MOINES, IOWA

### The EAGLE LINE



FINE MATERIAL  
WASHERS



COARSE MATERIAL  
WASHERS



LOG WASHERS



WATER SCALPING—  
CLASSIFYING TANKS.



"SWINTEK"  
DREDGE LADDERS



COMPLETE  
DREDGES



BREAKER BALLS &  
PILE HAMMERS.



run at right angles to and feed the cells in the floor which are continuous from one end of the building to the other.

### Chains Prevent Flooding

SOME SIZES OF STONE, when re-claimed to an off-bearing belt conveyor, tend to flood by rolling. The illustration shows an electrically vibrated feeder handling such material. Flooding is prevented by the use of chains. A baffle marked "A" is hinged to the tunnel structure. The normal flow of stone impinges against this swinging baffle, and any stoppage in the flow of stone is quickly indicated to the plant operator by a contact switch closing a circuit of warning



**Vibrating feeder equipped with chains to prevent flooding and a baffle operating a switch closes circuit of warning**

lights. This particular feeder is several hundred feet from the operator's station.

### Ramp Serves Kiln

IN THE ILLUSTRATION is shown a reinforced concrete ramp which rises up from the ground floor of building to the firing end of kiln. This arrangement permits trucks to deliver refractory materials or repair equipment to



**Refractory materials or repair parts** can be conveniently hauled up ramp by truck to the firing end of kiln



**Plastic sheeting** used as a lining for concrete wall sections produced a satiny surface

the firing-end level of the kiln. It also serves as a walkway for workmen.

At the other end of this building, at the ground floor level, is located a railroad track so that in the winter cars of materials which may be frozen are brought in to be thawed out.

### Plastic Sheeting for Precast Concrete Work

By C. E. WRIGHT

IN THE POURING OF CONCRETE SLAB WALL SECTIONS for the new \$2,000,000 plant of the Simmons Co., Jacksonville, Fla., the Flagler Co., Atlanta, Ga., used plastic sheeting very successfully as a lining.

It was first tried as an experiment in an effort to eliminate unsightly marks and imbedded dirt from the inside surfaces of concrete slabs. However, one of the results was a marble-like finish on the inside surface of the slab, making it an ideal wall surface which can be easily cleaned with soap and water. The plastic sheeting also gives positive proof of no bond and makes it easier to complete a section in one pour.

The Flagler Co. discovered the new possibilities when a quantity of Vis Queen plastic film, made by the Plastics Division of the Visking Corp., was purchased for use as a protective covering for materials and equipment. When some of the concrete slabs began sticking as they were being lifted from the forms, the idea occurred to Rolfe Edmondson, assistant superintendent, to try this plastic sheeting.

### Bottom-Dump Cars

AT A LARGE PLANT IN THE SOUTH, a standard gauge railroad is used for haulage from the pit to the plant due



**Railroad cars** equipped with truck dump gates and mechanism

to the swampy nature of the terrain. A 44-ton General Electric diesel-electric locomotive hauls a train of three cars per trip, each car holding 45 tons.

The cars originally saw service on the Mesabi iron range, but for hauling sand and gravel material from the pit the bottom-dump assembly was rebuilt using gates taken from Euclid trucks as well as the gate-closing mechanism. The change-over was desirable as the plant operator wanted the cars to have a gate opening which would be parallel to the track.

The circular track, illustrated, serves as a turntable.

# NEW MACHINERY

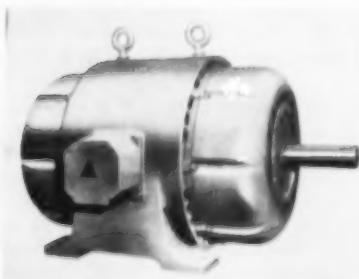


## Back Hoe Tractor Attachment

WAIN-ROY CORP., Hubbardston, Mass., has announced a combination back-hoe and back-fill blade attachment for the International 300 tractor. The combination is designed to handle various trenching jobs, bell hole and foundation excavation, backfilling, leveling, grading, etc. Both attachments are attached to a sub-frame which, together with self-leveling hydraulic stabilizers, relieves the tractor of heavy loads. The hoe is a self-contained unit and can be removed or attached in less than 30 min. Its effective digging depth is 11 ft. and it can dig and dump in a 190 deg. radius.

On the forward end of the sub-frame, a 6-ft. backfill blade is mounted, which raises and lowers hydraulically a distance of 18 in. above the grade to 8 in. below grade. The blade may be angled either right or left for backfill, as the tractor travels parallel to the trench.

Enter 100 on Reader Card

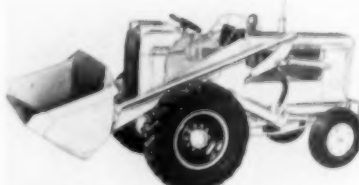


## Enclosed, Fan-Cooled Motor

GENERAL MOTORS CORP., Delco Products Division, Dayton, Ohio, has announced a totally enclosed, fan-cooled motor ranging in size from 20 to 200-hp., featuring a double-end ventilation system. Two external cooling fans, one at each end, draw air

directly across each bearing, then drive it the length of the motor through cooling tunnels cast in the walls of the main frame. The fans are designed to direct the air onto the bearing housing with considerable force, scrubbing away heat and maintaining uniformly cool bearing temperatures. Slot cell insulation is Mylar, bonded to high-quality electrical paper. The stator, after winding, is insulated with Delcote insulation, a combination of insulating varnish and cotton fiber flock which penetrates the space in the winding, sealing the slots off from dirt and moisture. The bearings are open type with provision for regreasing and pressure relief without removing part of the motor.

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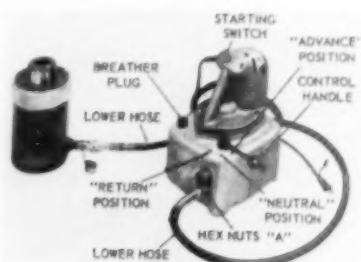


## Tractor Loader

TRACTOMOTIVE CORP., Deerfield, Ill., has added the TL-11 Tracto-Loader to its line of front-end loaders. The unit is a 1 1/8-cu. yd capacity model, and is designed for operations requiring large lifting capacity and confined area maneuvering. It has front wheel drive for better traction and is equipped with rear wheel power steering. It has a 3:1 torque converter and a clutch-type transmission to permit changes in travel direction without shifting gears. At the normal carrying height of 3 ft., the bucket can be tipped back to an angle of 41 deg., enabling heaped loads to be carried without spillage. At ground level, the bucket can be tipped back to 22 deg., and maximum clearance under the hinge pin when dumped is 10 ft. 3 in.; at this dumping height the machine has a reach of 2 ft. 7 1/2 in.

Power is furnished by either a 63-hp., four-cylinder gasoline engine or a 77-hp., six-cylinder diesel engine. A 12-volt electric system is provided with the diesel model. Overall length of the unit with the bucket in the carrying position is 15 ft. 4 in. In this position it can turn in a radius of 12 ft. 3 in.

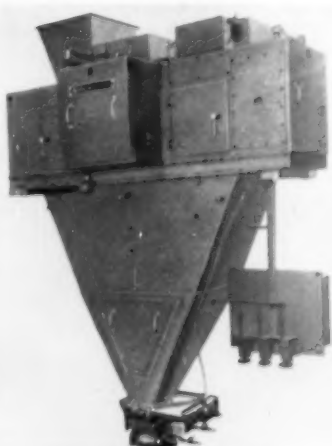
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## Electric Hydraulic Pump

TEMPLETON, KENLY & CO., 2525 Gardner Road, Broadview, Ill., has brought out the No. 798 CO electric hydraulic power pump, which is reported to raise a 60-ton capacity Simplex "Re-Mo-Trol" ram 1 in. in half a minute. The electric pump has a displacement of 30 cu. in. of oil per minute at 10,000 p.s.i. When used with the "Re-Mo-Trol" single or two-way rams, it provides combination units with capacities from 10 to 100 tons for lifting, pushing, or pulling heavy loads. The pump has a built-in 1/2-hp. universal motor and a two-speed automatic changeover. A built-in safety bypass valve is utilized, and a selector valve reverses the plunger on rams.

Enter 103 on Reader Card



## Automatic Bagging Scale

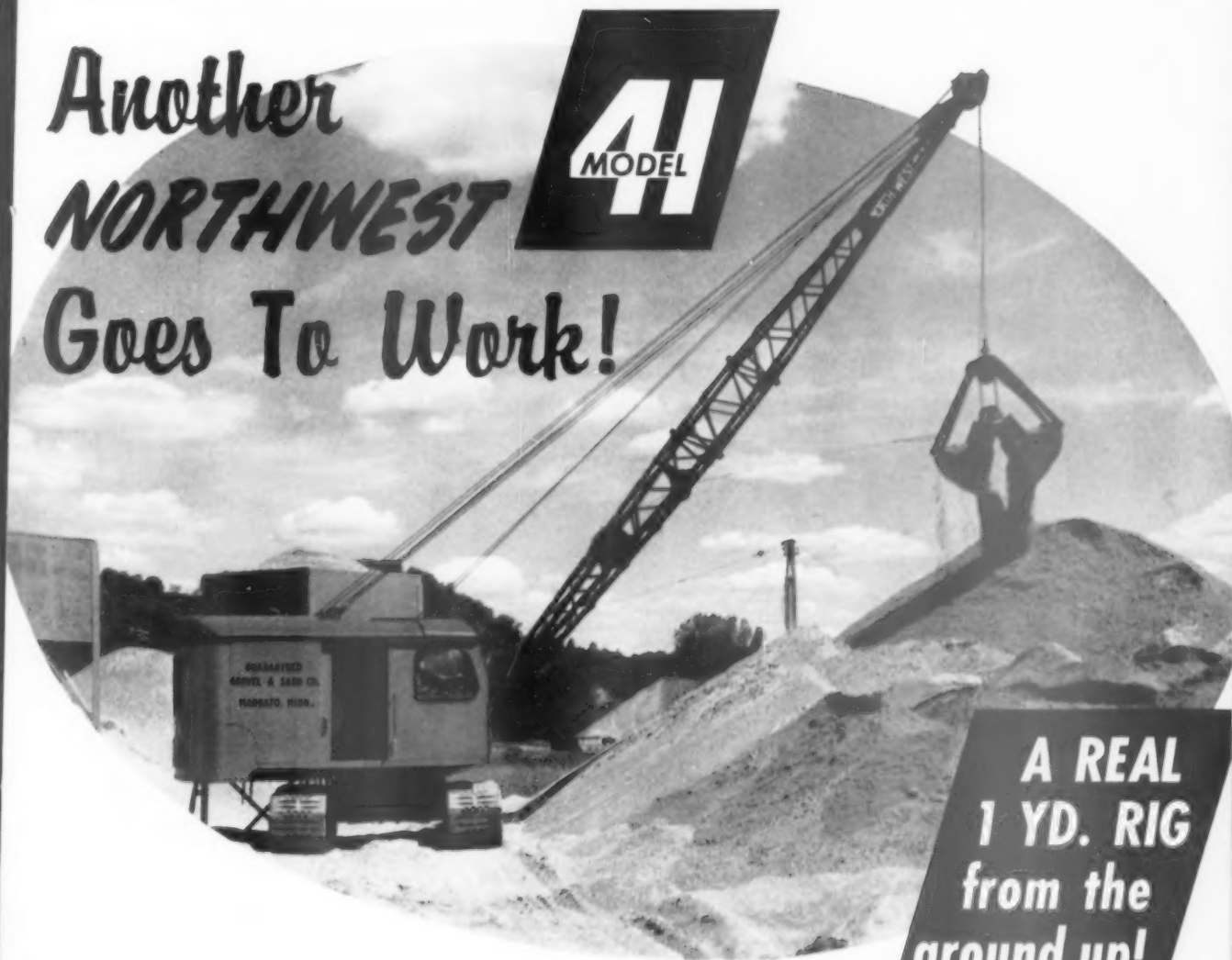
RICHARDSON SCALE CO., Clifton, N. J., has introduced the "Weighblender" automatic bagging scale which proportions and bags 10 or more sacks of dry aggregate ingredients per minute. The system is designed particularly for

(Continued on page 63)

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# Another NORTHWEST Goes To Work!

**41**  
MODEL



**A REAL  
1 YD. RIG  
from the  
ground up!**

HERE'S another Northwest Model 41 for Minnesota, the second Northwest for Guaranteed Gravel & Sand Co. at Mankato.

Here is a *real 1 yd. machine*—built from the ground up as a 1 yd. machine and capable of the output you expect from a 1 yd. machine.

Along with full 1 yd. capacity the Model 41 brings you all the advantages that have made Northwests famous for high output and low upkeep costs. Cast steel machinery bases and machinery side frames take the shocks of digging and assure shaft alignment. The "Feather-Touch"

Clutch Control makes operation easy without resorting to complicated and delicate valves and pumps. Uniform Pressure Swing Clutches take the jerks and grabs out of swinging. Positive traction while turning as well as when going straight ahead takes your 41 where other equipment has difficulty. Easy convertibility by simply changing booms equips you with a Shovel or Pullshovel and adds value for the man who buys it from you.

If you are planning on new excavating or crane equipment now is the time to plan on a Northwest. Let us send you a catalog on the size machine you require.

**NORTHWEST ENGINEERING COMPANY**  
135 South LaSalle Street, Chicago 3, Illinois

# NORTHWEST

**SHOVELS • CRANES • DRAGLINES • PULLSHOVELS**

*Convertible for any Mining Material Handling or Excavation Problem*





# AIRALON

## for Low-Cost Air Entrainment

Where cost control is to be stressed in air entrainment of masonry cement, experience dictates Airalon. This convenient compound has a uniform ratio of saponified resin acids and fatty acids for consistent air entrainment, plasticity and water retention. Now shipped in non-dusting, moisture-resistant "chip" form, packaged in new, protective polyethylene-lined bags.

# CEMENT MILL

## MAKING RESEARCH PAY OFF FOR YOU

It's not by chance that Dewey and Almy cement mill products set the additions standard for quality and performance. Each product had its beginning in the world's finest privately-owned cement and concrete laboratories.

Since 1932 these laboratories have been the scene of untiring research. Here are probed many aspects of the chemistry of cement and concrete. Here it is possible to duplicate nearly every conceivable cement mill or construction situation. Thus, the research is *utterly practical*.

Our products—Airalon, TDA, MTDA and MRDA among them—are presented to the trade by field men whose knowledge and technical skill are among the best in the industry.

Cement mill production men rely on these products for uniform quality and for performance that matches specifications. Contractors and builders also value these products in their cement usage . . . further proof that research that begins in the laboratories pays off *on the job*.



**DEWEY AND ALMY**

**CHEMICAL COMPANY**

DIVISION OF W. R. GRACE & CO.



CAMBRIDGE 40, MASS. • MONTREAL 32, CANADA • CHICAGO 38, ILL. • SAN LEANDRO, CALIF.





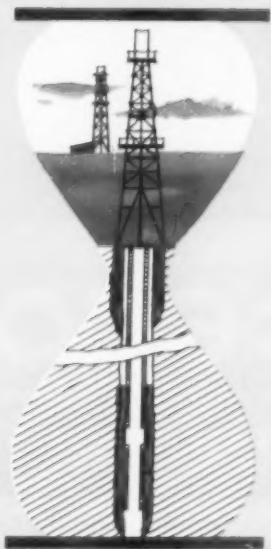


## **TDA<sup>AND</sup> MTDA<sup>FOR</sup>**

### **Increased Finish Grinding Mill Output**

These widely-used, reliable, clinker grinding aids are used in finish grinding of portland cement. (80% of all mills producing portland blast-furnace slag cements employ TDA or MTDA.) With them, mill output increases 10—50%. They contain catalysts which speed hydration of cement. TDA is highly effective in the grinding of High Early Strength cements and is ASTM approved.

# **STANDBYS**



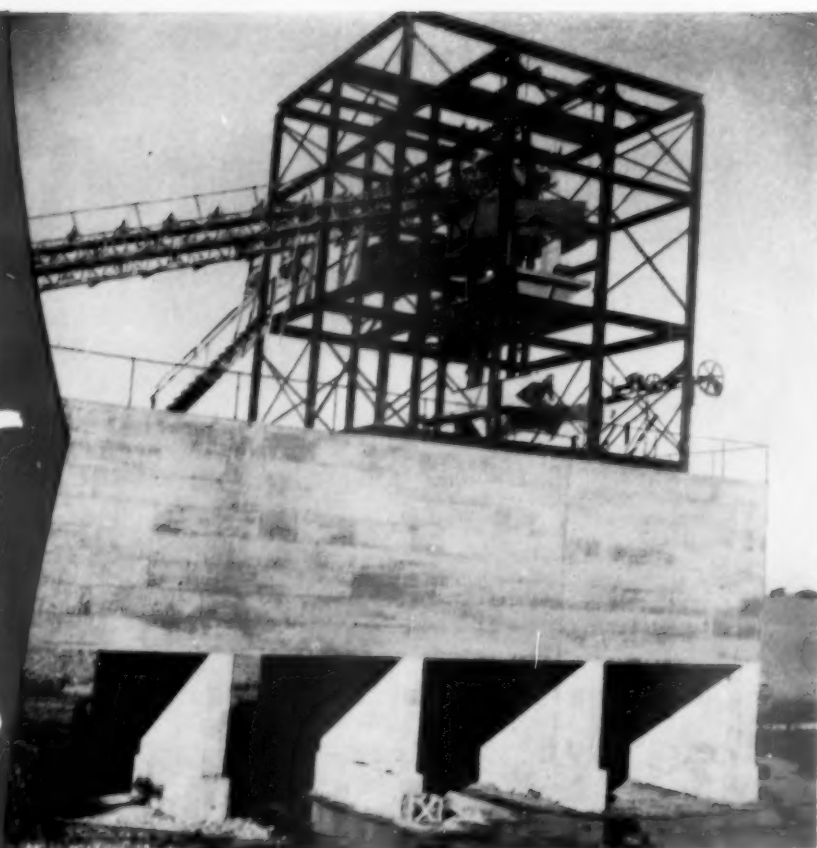
## **MRDA**

### **for Uniform Pumping Time**

Specially compounded retarder for slow-setting oil well cement, MRDA contains carefully selected ingredients. These ingredients—plus the watchdog action of our unique infra-red spectrophotometer—give essential assurance of the desired uniform retardation.

Enter 1214 on Reader Card

**NEW  
2,000  
T.P.D.  
PLANT  
relies on  
SECO  
SCREENS**



*Photographed on the job Preston, Ontario (Pit & Quarry photograph)*

## **PRESTON, ONTARIO SAND AND GRAVEL PLANT A MODEL FOR INDUSTRY**

From 150 T.P.D. production capacity in 1949 to 2000 T.P.D. today. This summarizes the remarkable growth story of the Preston Sand and Gravel Company, under the dynamic ownership of Thomas J. McGovern.

When Mr. McGovern took over this business about six years ago, he was determined to get a larger share of the market which meant clean, uniformly sized gravel. The resulting increase in business soon created the need for greater production.

Thus, in setting up the modern continuous flow plant which began operation in March 1955, Mr. McGovern chose SECO screens for all the screening requirements from scalping to final sizing. Three are set in the superstructure (closed in after the above photo was taken) and the fourth is assigned to the scalping operation shown in smaller photo.

In Mr. McGovern's own words, "We believe we could not find any vibrating screens to equal our SECO's for satisfactory performance."



**SECO**  
TRUE CIRCULAR ACTION  
**VIBRATING SCREENS**

**Screen Equipment Co., Inc.**

Buffalo 25, N.Y.

*Manufacturers of Vibrating Screens  
Exclusively*

SEND FOR NEW SECO  
CATALOG No. 204 TODAY

Enter 1030 on Reader Card

the "do-it-yourself" dry-mix concrete market. The unit consists of a series of three scales mounted in a base frame, with the bagging hopper beneath arranged to receive simultaneously from all three scales, thus permitting blending of ingredients as they enter the bag. The system accommodates bags ranging in capacity from 25 to 100 lb.

Each unit is totally enclosed in a 12 gauge dustproof housing, and the access doors are heavy gauge steel with soft sponge seal liners. Air vents are provided to exhaust dust to the atmosphere or to a reclamation system. A solenoid-operated air cylinder opens each inlet gate for gravity feeding of free-flowing materials, and screw feeding for cement ingredients. On completion of a weighing cycle, a limit switch is actuated and the air gate closes. The number of weighings is added on a direct-connected mechanical counter. Electrically impeded counters are also available for remote indication. The scale is offered with either a manually operated or air-operated bag holder.

Enter 104 on Reader Card



### Heavy Duty Rotary Drill

THE WINTER-WEISS CO., 2201 Blake St., Denver, Colo., has announced a heavy duty rotary drill, known as Model 6TA, for vertical blast hole drilling. Mounted on a Caterpillar D6 diesel prime mover, the drill utilizes compressed air for removal of cuttings, and two rotary compressors, operating singly or together, provide a maximum of 85 p.s.i. air pressure with normal drilling pressures of 15 p.s.i. Up to 27,000 lb. weight can be applied on the bit and, using standard oil field roller cone rock bits, the drill averages

a foot or more a minute of 9-in. hole in most formations. It is completely unitized with no auxiliary equipment necessary; all power supplied by the tractor engine through a heavy transfer case; and all controls are located at the rear of the drill to provide the operator with full view of drilling operations.

Enter 105 on Reader Card



### High Pressure Oil Gun

LINCOLN ENGINEERING CO., 5702-46 Natural Bridge Ave., St. Louis 20, Mo., has announced a hand-operated high-pressure oil gun for contacting standard lubrication fittings. Metal rings anodized in various colors are used with the pressure oil gun. These are slipped over the head of each fitting to provide a color coding system for the bearings requiring oil, thus simplifying standardization. Also, these rings make the accidental use of a grease gun impossible.

Enter 106 on Reader Card

### Large Eccentric Jaw Crushers

MORGÅRDSHAMMARS MEK VERKSTADS AKTIEBOLAG, Morgårdshammer, Sweden, has announced the manufacture of overhead eccentric jaw crushers in sizes of 47- x 35-in., 47- x 59-in., and 55- x 71-in. Designated "Boulder Crushers," the machines were designed to meet the need of a primary underground crusher, big enough to receive run-of-mine stone, but not too expensive for small mines and easy to move underground. The main frame is in four sections, and the solid bearing housings for the frame bearings of cast steel are bolted to the frame. On the AR 120 (47- x 35-in. unit), they are split and the lower part is integral with the frame. The swing jaw is made of cast steel, one piece construction, and of box-section design to reduce the weight. Information on the units, AR 120 (37- x 35-in.), AR 150 (47- x 59-in.) and AR 180 (55- x 71-in.) is available from Sweden.

Enter 107 on Reader Card



### Shovel Crane Mounting

THE THEW SHOVEL CO., Lorain, Ohio, has announced a new method of attaching shovel crane turntables to crawler or rubber-tire mountings, designated the "Shear Ball" mounting. It is said to eliminate the need for top or hook type turntable rollers, for center pins and nuts, for exposed roller paths, and for centering gudgeons, along with the maintenance and adjustment usually necessary with these items. The mounting is standard equipment on two models of Lorain cranes and is available as optional equipment on others in the line. The mounting consists of a continuous circle of hardened steel balls, sealed in a hardened, precision-ground race. Because of the large number of balls to take loads, there is no appreciable wear and little stress on any one ball, which enables increasing crane lifting capacities on outriggers on certain models.

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### Angling Blade Bulldozer

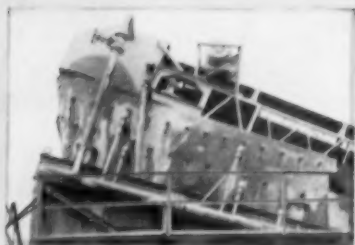
CATERPILLAR TRACTOR CO., Peoria, Ill., has announced the No. 977A, No. 955A, and No. 933A angling blade bulldozers, designed for use with No. 977, No. 955, and No. 933 Traxcavators, respectively. With the exception of the 933A C-frame group, the bulldozers consist of the same blade and C frame groups as the No. 6A,

(Continued in page 67)

# PROFIT THROUGH ...WITH SIMPLICITY



A 4' x 12' and a 4' x 10' Triple Deck Model D Gyration Screen, set in tandem, performs a final washing and sizing operation. The washed gravel is fed to five storage bins, so that any specification can be met by blending on the conveyor belt underneath these bins.



This Simplicity 5' x 14' Two Deck Model D Gyration Screen takes its feed from the raw material stock pile via conveyor. All decks have washing sprays. The three products produced of sand and gravel are fed by conveyors to individual stock piles.



Aggregate is carried right from the pit to this Simplicity 3' x 8' Model BG Heavy Duty Scalping Screen. Fines are screened through to the conveyor below, while oversize is scalped to crusher.





# ACCURATE SIZING GYRATING SCREENS

**4,500 tons of aggregate a day is classified by four Simplicity screens at Holly Sand and Gravel, near Holly, Michigan**

Working two shifts of 9 hours each, the Holly Sand and Gravel Company is daily processing 4,500 tons of aggregate, and the firm's General Manager expects to exceed this total in the near future. All this material is sized on four Simplicity screens. Simplicity Model D Gyrating Screens and a Model BG Scalping Screen efficiently and accurately classify the aggregate into grades 10A, 6A, Pea Rock, Torpedo Sand, and Mason Sand. This fast and accurate sizing is typical of the performance of Simplicity Screens throughout the aggregate industry. In addition, a 3' x 6' Model C Single Deck Screen has recently been installed to produce 100% clean Pea Pebbles, by eliminating the buckshot. The Simplicity Gyrating Screen is the original

type of mechanically vibrated screen using the counterbalanced eccentric shaft. The counterbalance is machined directly on the shaft, thus giving positive action with perfect smoothness.

Simplicity Gyrating Scalpers are heavy-duty machines built on the same basic principles as the Gyrating Screens, but with a grizzly deck to scalp off the oversize rock. These units are designed to withstand terrific impact. They perform two jobs at once by feeding the oversize into a crusher, and screening the fines.

Wherever you need fast, efficient scalping, screening, or feeding in your aggregate operation, Simplicity equipment can be a big help to you . . . write us today for complete information.



**ENGINEERING COMPANY • DURAND 13, MICHIGAN**

**SALES REPRESENTATIVES IN ALL PARTS OF THE U.S.A.**

**FOR CANADA:** Simplicity Materials Handling Limited, Guelph, Ontario

**FOR EXPORT:** Brown and Sides, 50 Church St., New York 7, N. Y.



182



**Ingersoll-Rand**  
**DRILLMASTER**

## One **DRILLMASTER** keeps three shovels busy!

WORKING NIGHT AND DAY in a big rock cut on an eastern turnpike extension, the DRILLMASTER shown above was sinking 6-inch blast holes and keeping one 3½-yard and two 3-yard shovels busy handling the rock produced.

By means of DRILLMASTER's "down the hole" Depth-Master drill, holes 55 feet deep were drilled on 14-foot centers with 19-foot burden. Average overall footage ran 25 feet an hour, and production topped 5900 gross cubic yards in 24 hours. The DRILLMASTER Carset Jackbits delivered an estimated total life of 10,000 feet of hole, with over 800 feet between sharpenings.

An exclusive DRILLMASTER feature, the unique "down the hole" Depth-Master drill goes down with the bit. It avoids the waste of power normally required to overcome the inertia of long lengths of drill steel.

The three-way DRILLMASTER can also be used as a Rotary drill or with the Power-Master combination "out of the hole" drill. Complete packages—including tower and accessories—are available for tractor or truck mounting.

Write for Bulletin 4179.

5-388

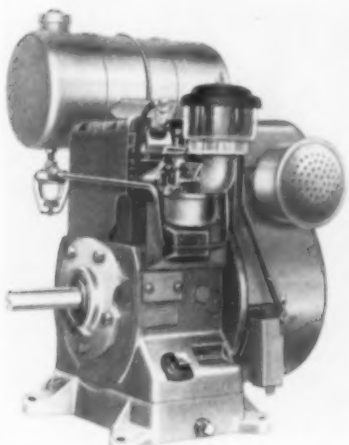


**Ingersoll-Rand**  
11 Broadway, New York 4, N.Y.

ROCK DRILLS • COMPRESSORS • AIR TOOLS • TURBO BLOWERS • CONDENSERS • PUMPS • OIL & GAS ENGINES  
Enter 1031 on Reader Card

No. 4A and No. 2A bulldozers. Heavy-duty links connect the bulldozer C-frame to the Traxcavator lift arms, and the same hydraulic controls and cylinders are used for both the bucket and blade.

Enter 109 on Reader Card



### Short Stroke Engine

D. W. ONAN AND SONS, INC., Minneapolis 14, Minn., has developed Onan Model AJ engine, a single-cylinder, air-cooled, 4-cycle, gasoline-powered engine developing 5.5 hp. at 3600 r.p.m. Weighing 86 lb., the engine has a 2 3/4-in. bore; 2 1/2-in. stroke; 14.9 cu. in. piston displacement and a compression ratio of 6.25:1. It has a removable aluminum alloy cylinder head and a fully counter-weighted, balanced crankshaft. The engine has high tension magneto ignition and is started by means of a manual pull rope. A recoil starter and electric starter are included among the optional equipment.

Enter 110 on Reader Card



### Electronic Potentiometer

THE BRISTOL CO., Waterbury 20, Conn., has announced an electronic potentiometer equipped with a pneumatic transmitter which sends a 3-15 p.s.i. signal proportional to the measured variable. The transmitter is available in either potentiometer or bridge circuits, and will measure any variable which can be translated into an electrical quantity. It then converts the measurement into a universal 3-15

p.s.i. pneumatic signal for transmission to a remote pneumatic indicator or recorder, or automatic controller. Standard electronic and pneumatic components are used, and the instrument is available either "blind" or with an indicating scale for at-the-scene measurement.

Enter 111 on Reader Card

### Truck Crane

KOEHRING CO., Milwaukee, Wis., has announced the Model 305 excavator, which, as a crane, will lift up to 25-ton loads, and has a road travel speed of 30.2 m.p.h. The upper machinery arrangement has been simplified to contain two major horizontal shafts and the all-welded turntable is equipped with integral sidestands on which the main cross shafts revolve in antifriction bearings. The truck crane turntable swings on six adjustable hook rollers, designed to resist tipping in any direction.

The unit is adaptable to various operations including lifting, clamshell, dragline, grapple, magnet and pile driving work. For special lift crane service, the standard 30-ft. main boom can be extended to a maximum allowable 100 ft. length. In addition, a jib boom up to 30 ft. long can be added. The truck chassis is provided with five main and two auxiliary forward speeds. The standard wheelbase is 205 in. with 9-ft. axles for greater lifting capacity over the side and rear, and front and rear outriggers are incorporated for extra support during stationary lifting operations.

Enter 112 on Reader Card



### Barrel-Shaped Tires

THE GOODYEAR TIRE AND RUBBER CO., Aviation Products Division, Akron, Ohio, has announced the "Terra-Tire", a barrel-shaped, low-pressure (3- to 5-lb.) pneumatic tire that can be powered through its axle by any conventional drive system. Through a hub and axle fitting, the tire receives its motive power directly from the engine. This is said to represent a considerable saving in weight, mechanical complication and cost. Low-pressure inflation enables the tires to conform to rough, uneven terrain; heavy loads may be sustained because weight is spread over wide areas of

the tires; and vehicles so equipped can roll over cultivated areas without rutting, the company claims. In the illustration the Terra-Tires are used on a Dodge Power Wagon.

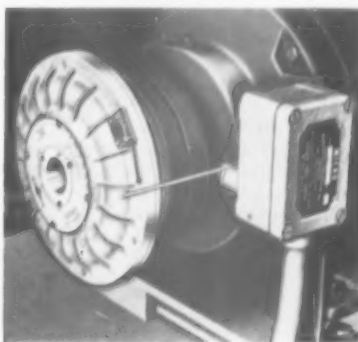
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### Dust-Collecting Scrubber

THE JOHNSON-MARCH CORP., Philadelphia, Penn., has brought out a new unit designed to control fumes, odors and microscopic solids. Known as the Type A Hydro Precipitator Scrubber, the unit is engineered to remove low and sub-micron size particles from exhaust gases.

Enter 114 on Reader Card



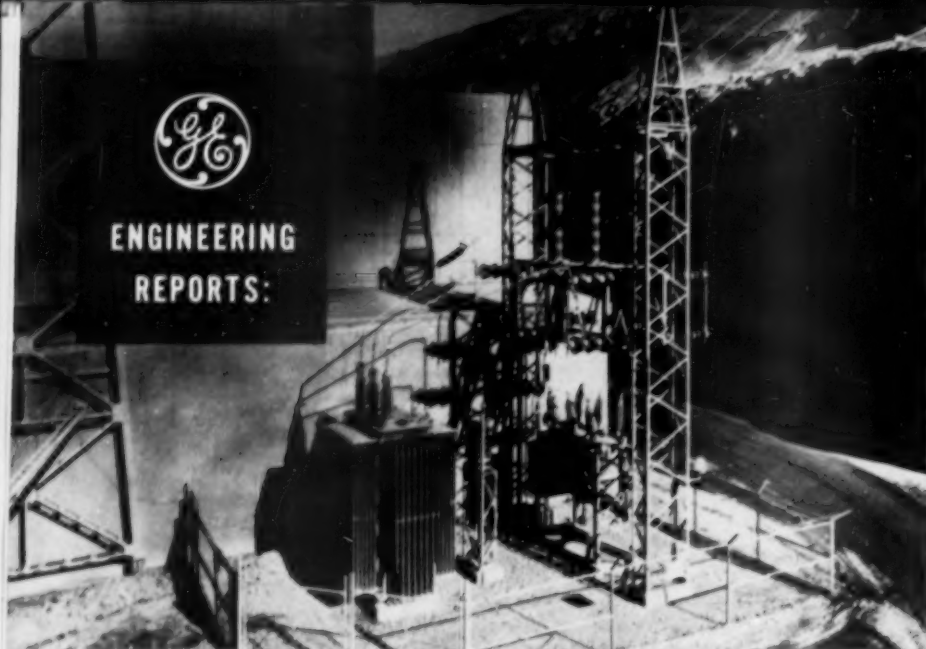
### Thermal Cutout

DODGE MANUFACTURING CORP., Mishawaka, Ind., manufacturer of Flexidyne, the dry fluid drive, has announced a Thermal Cutout to protect Flexidyne against overheating. Mounted on the side of the Flexidyne, the cutout contains a trigger spring, held down by an alloy thermal pin. If an overload causes prolonged slipping, before the Flexidyne can heat up enough to cause any damage, the pin will melt, allowing the trigger to spring out so that it will push the non-sparking striker to the "off" position.

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## ENGINEERING REPORTS:



**EASILY EXPANSIBLE** G-E outdoor-indoor substation supplies plant power. Lightning arresters, circuit breaker with isolating switches, transformer, and system neutral grounding resistor are outdoors. High-creepage insulators reduce frequency of shutdowns for bushing cleanings.



**RELIABILITY** of G-E metalclad switchgear (indoor part of main substation) is reviewed by Carl



**CENTRALIZED** control of raw and finish mill 440-v motors is supplied by G-E Cabinetrol\* units. Custom assembled from standard G-E components, they allow easy addition of sections.

\*Reg. trade-mark General Electric Co.



**"BUILDING BLOCKS"** of power for expansion, G-E load-center unit substations can be added as needed to serve new load. Installed close to load, they reduce voltage drop, length of feeders.

†Trade-mark General Electric Co.

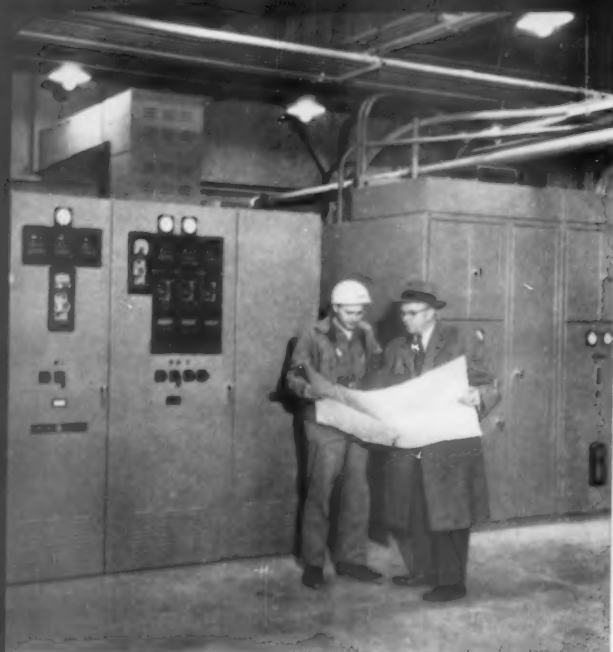
# G-E power system will

**Planned-in-advance flexibility  
already paying off at new  
Sugar Creek facilities**

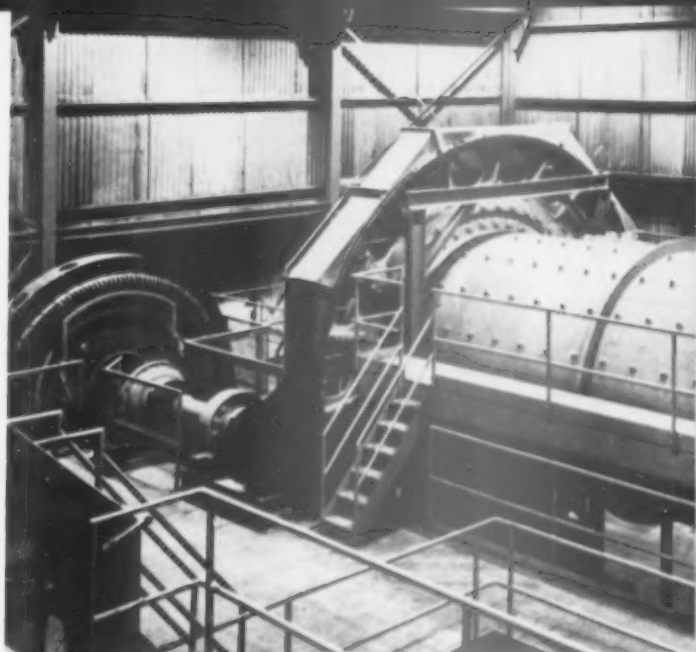
Utilizing latest designs for dry-process plants, Missouri Portland Cement Company's new plant unit at Sugar Creek, Missouri, is now producing over 3000 barrels per day. However, in the face of ever-growing demands for cement by all industry, the company is already proceeding with expansion that will double plant capacity in the near future. This expansion will be smoother, less







Leonard (left), plant electrical foreman, and G-E sales engineer Harry Moak. Limitamp† starters (right) provide precision control of high-voltage motors, allow mill spotting.



**RUGGED SERVICE** is performed by 1250-hp, high-torque, synchronous motor driving 9½' x 32' finish mill. Motor was designed for across-the-line starting and to allow spotting of mill manholes.

## help ease expansion at new Missouri Portland plant

expensive, and more simply accomplished because, with the help of G-E engineers and equipment, plant designers planned ahead to assure easy expansibility through use of modern power system design.

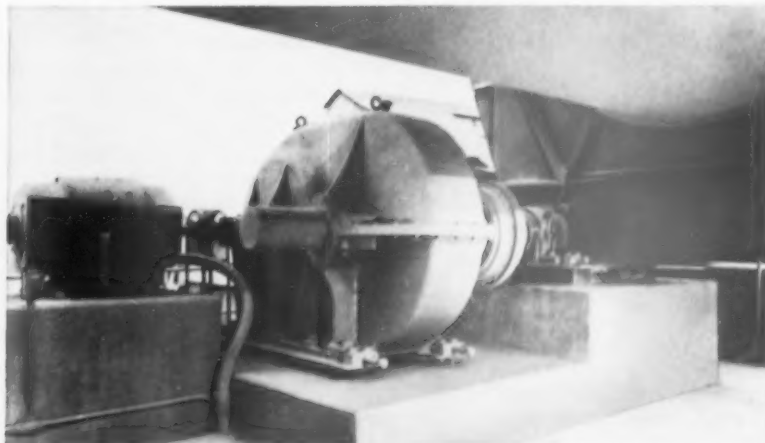
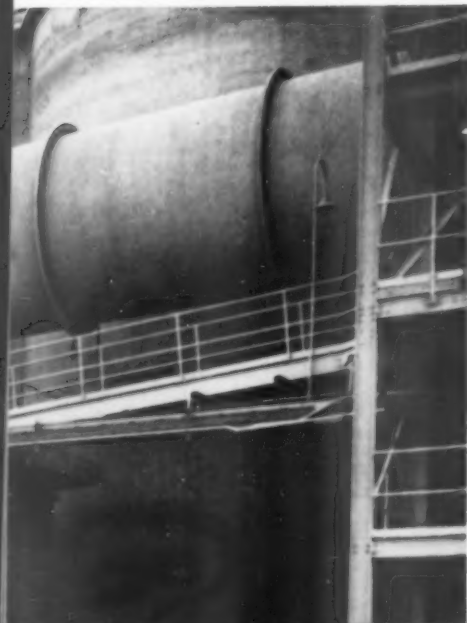
**Working closely** with Missouri Portland's engineers and consultants, General Electric cement industry application engineers helped develop this flexibility in an electrical system integrated with plant processes to facilitate smooth-flowing, reliable operation. Processing,

as well as most materials-handling operations, is nearly 100-percent powered and controlled by G-E equipment.

**Early in your electrical planning** for a new or expanding cement plant, use G-E engineering aid to assure an electrical system designed for maximum output today and flexibility for expansion tomorrow. For further information contact your G-E Apparatus Sales Office or write for Bulletin GEA-5984 to General Electric Co., Section 658-16, Schenectady, N. Y.

Engineered Electrical Systems for the Rock Products Industry

**GENERAL**  **ELECTRIC**



**UNIFORM, CONTROLLABLE** kiln speed provided by G-E adjustable-voltage, d-c motor (above) with speed reducer improves quality of cement through better process control. The 11¼' x 350' kiln is shown at left. General Electric motor-generator set and kiln-drive controller are installed beneath motor, inside kiln pier at far left.



## "Good-Will" techniques in blasting make good friends and neighbors

Modern blasting calls for the utmost consideration of the homes and businesses that make up a community. The regular routines of life must continue without disruption.


To help you make good friends and neighbors, AMERICAN's engineers have developed many "Good-Will" techniques that help you to reduce noise, vibration and shock to a minimum, and at the same time enable you to achieve maximum blasting efficiency.

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AMERICAN plants and magazines are conveniently located for quick delivery direct to your operation. Call on AMERICAN for assistance on any unusual blasting problems.

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High Explosives	Electric Blasting Caps
Permissibles	Instantaneous
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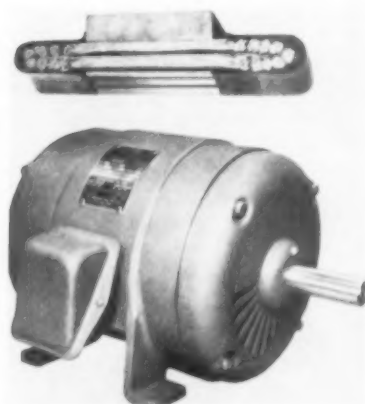
Sales Offices: New York City, Latrobe, Pa., Pottsville, Pa.,  
Scranton, Pa., St. Louis, Mo., Bluefield, W. Va.

Enter 1032 on Reader Card

## Rotary Oil Burners

IRON FIREMAN MANUFACTURING Co., Cleveland, Ohio, has announced a series of rotary oil burners, with integral air registers, ranging in size from 9 g.p.h. to 125 g.p.h. The burners will fire with No. 6 or lighter oil, and are designed for either natural or induced draft. The integral air register is designed to assure maximum combustion efficiency over a wide firing range. A modulating type automatic actuator provides the correct amount of fuel and air to maintain desired water temperature or steam pressure, and primary combustion air is supplied by the burner fan; secondary air is introduced through the air register. Electronic safety controls automatically shut off the burner if an unsafe condition arises. A programming control sets up the proper sequence of operations in stopping and starting the burner. A limit control operates the burner to hold temperature or boiler pressure at the necessary level.

Enter 116 on Reader Card



## Electric Motors

THE LINCOLN ELECTRIC CO., Cleveland, Ohio, has announced a line of "Linc-Weld" electric motors, available in standard sizes from 1 to 40 horsepower, with extruded plastic insulation. The thermo-setting plastic insulation is molded into and around the stator windings. The liquid plastic resin is extruded through the stator slots, completely covering the stator winding. After the plastic resin sets, the stator is removed from the die, resulting in a motor winding completely encased in a rigid, durable mass. The plastic is said to be resistant to chemical action, humidity, abrasive dust, lint, and oil vapor.

Although the motor is built in the open type frame, the company states that it may be used as a splash-proof motor. It may also be used as a totally-enclosed motor in various applications.

Enter 117 on Reader Card



## Industrial Tractor Line

MASSEY-HARRIS-FERGUSON, INC., Industrial Division, Racine, Wis., unveiled its new, full line of light- and medium-duty utility industrial wheel tractors and allied attachments before a group of trade magazine editors on June 20. According to H. H. Bloom, president, the new tractors are designed to fill the gap between light and heavy equipment in three areas—as primary equipment on small work- and run jobs, as back-up machines for medium- and high-priced, single-purpose equipment, and as versatile clean-up and utility tools.

The new tractor line comprises M-H-F Work Bull models 202 (illustrated), 303, 404, 202 Forklift, and the Davis Pit-Bull, with about twenty M-H-F and Davis hydraulically-controlled front- and rear-end attachments being available. The Pit-Bull and the Davis attachments are made by Mid-Western Industries, Inc., Wichita, Kan.

The three Work Bull models deliver 34 hp. (134-cu. in. engine), 42 hp. (208 cu. in.), and 52 hp. (277 cu. in.), respectively. Among the features are heavy-duty clutch, heavy-duty front axle and support, gear-driven differential, worm and sector steering, full-pressure lubrication, five-speed transmissions for the 303 and 404 models and six-speed transmission for the 202, (maximum forward speed of 15 m.p.h.), individual rear-wheel brakes, power steering (optional on 303 and 404); and 12-volt electrical system. Diesel engine and power take-off are optional on the 303 and 404.

The 202 Forklift is based on a specially built unit, using the basic 202 in reversed position with the load over the large rear drive wheels. Lift height is 10 ft. with 3000-lb. capacity, but can be extended to 20 ft. for lighter loads. The fork cranes may be detached and replaced with either

dozer blade or bucket loader.

The Davis 185 Back Hoe, with 12-36 in. bucket sizes, is available for all Work Bull models except the 202 Forklift. Davis 9- and 11-cu. ft. front end bucket loaders are available for the 202, and 11-cu. ft. and 3½-cu. yd. (Davis 500) loaders for the 303 and 404. Other attachments include graders, angle-dozers and dozer blades, broom, rotary trencher, scarifier, lift fork, snowplow, swinging crane, etc.; these can be installed and changed quickly.

The Davis Pit Bull, illustrated, with a ¾ cu. yd. bucket capacity, features a torque converter, hydraulic reversing clutch which permits instantaneous direction changes without shifting, five speeds forward, five reverse, either gas or diesel 42-hp. power plant (201-cu. in. displacement), and optional power steering. Attachments include bucket loader, 8-ft. angle dozer blade, 12-36 in. back hoe, 2000-lb. forklift, scarifier, hydraulic utility crane, and 8-ft. hydraulic angled broom.

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## Torque Converter

NATIONAL SUPPLY CO., Pittsburgh, Penn., announces the availability of its full line of heavy duty hydraulic torque converters for use on excavating, earth-handling, and construction machinery. Until recently their use was limited to oil field machinery and equipment. National single stage torque converters are manufactured in a range of 100 to 1000 hp. This has been accomplished with six basic sizes which includes 17 power capacities in closely spaced ranges for exact matching with engines and electric motors.

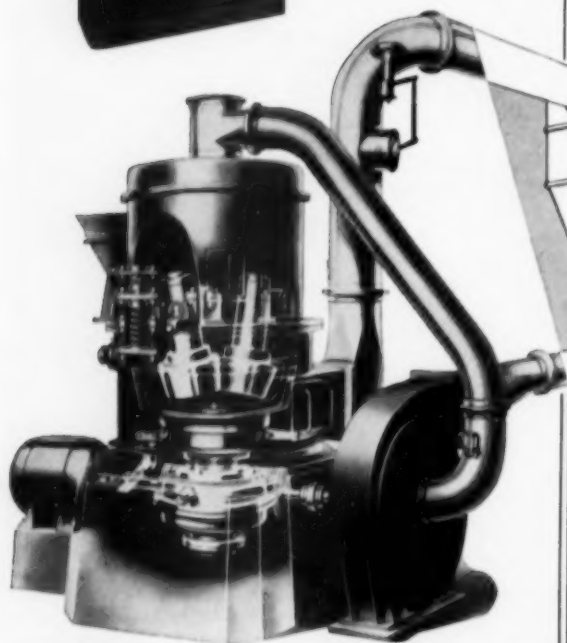
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# RAYMOND BOWL MILL Direct Firing Unit



## VISUAL CONTROL PANEL

Shows a continuous operating picture of the Bowl Mill . . . several mills may be handled as easily as a single unit.



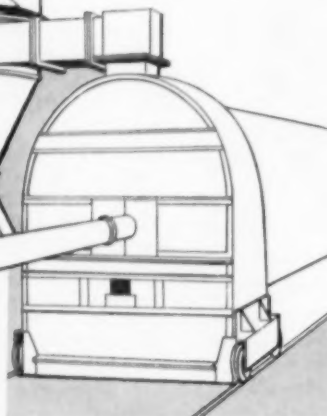
Write for Catalog No. 75

# Engineering ..... GOES WITH

RAYMOND ENGINEERS  
cooperate with the  
ENGINEERS OF INDUSTRY

## Bowl Mill Firing

is an important factor of efficiency in cement production, as it provides flexible firing control and economy of operation. Record low costs per barrel of cement are consistently shown in Raymond installations throughout the industry.



Proper coal-air mixture is maintained with Bowl Mill firing for proper burning and maximum kiln efficiency.

Handles coal of any grade or moisture content. Easily adjusted or lubricated while operating. Sturdily built for continuous 24-hour operation. Adjustable for a wide range of capacity.

Adaptable to rotary kilns for cement, lime, dolomite, light weight aggregates; also for industrial furnaces.

SALES OFFICES IN  
PRINCIPAL CITIES

# COMBUSTION

## RAYMOND DIVISION



# Service — RAYMOND EQUIPMENT

If you are building a new cement plant or modernizing the old one, Raymond experience can help you in developing maximum production efficiency.

Raymond engineers will work closely with you in selecting the proper size and type of equipment to meet your capacity requirements, and to insure long term economy in kiln firing and cement classification.

## Whizzer Separation

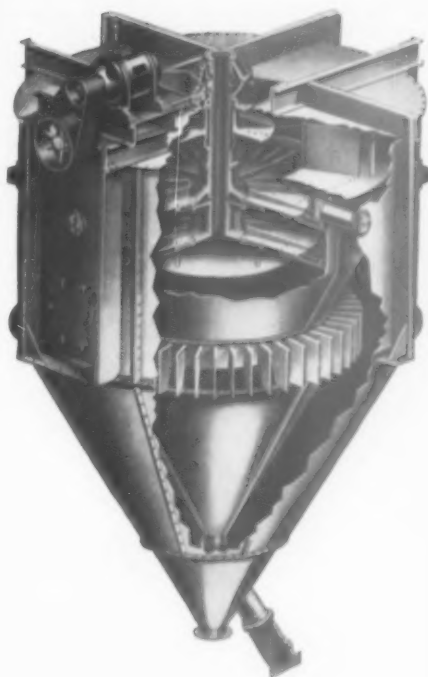
The Raymond Mechanical Air Separator with the patented revolving Whizzer provides an important link in the cement production line. With its easy fineness control and close separation of fractions, it does a precision job in the classification of raw mix or cement clinker.

With the proper setting of the separator, the external adjustment of the slide dampers controls the fineness of specific surface area. Standard Portland grades up to high early strength cement can be produced without internal changes.

The resulting increased output, ranging from 25% up, and the improved plant efficiency due to closed circuit operation, make the Raymond Separator a "natural" for raising cement production and reducing the per-barrel cost of any grade you purchase.

For further details, see  
new Raymond Bulletin #76.

## RAYMOND MECHANICAL AIR SEPARATOR



In closed circuit grinding operations Raymond Separators maintain uniformity of product, boost overall mill output, and add to the efficiency of the complete unit of equipment.



# ENGINEERING, Inc.

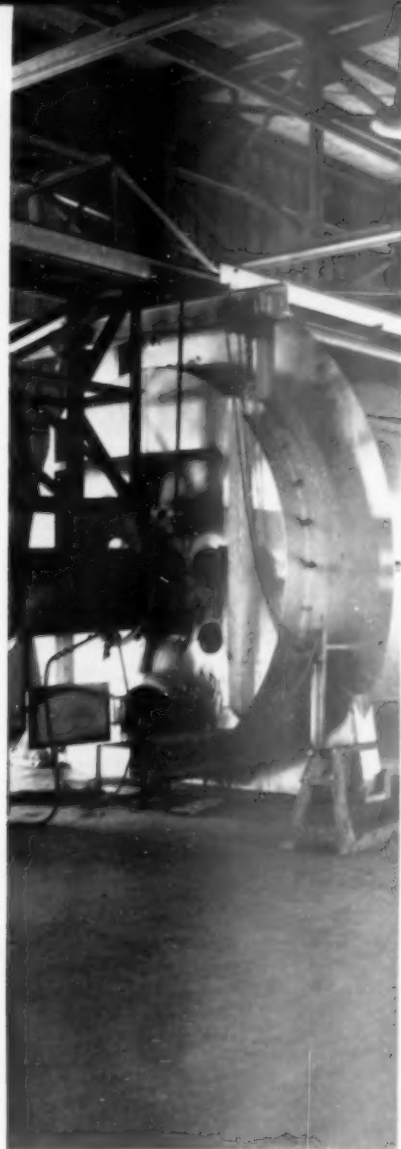
1307 NORTH BRANCH STREET • CHICAGO 22, ILLINOIS

Combustion Engineering-Superheater Ltd., Montreal, Canada

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By JOSEPH N. BELL

# Cement Industry Expansion— How Far?



**T**HE CEMENT INDUSTRY shortly must face up to a basic decision. The tremendous flurry of new plant construction and existing plant expansion and modernization soon will be an accomplished fact. The result: a growth almost unparalleled in industrial history.

Yet, even before this new capacity is in production, the gnawing question presents itself: should we expand further, or is this the millenium, at least for some years to come? The answer is of fundamental interest not only to the manufacturers of portland cement, but to the entire rock products industry—most of whom either supply the raw material from which cement is made, the aggregates with which it is mixed, or sell the finished product, concrete.

To find and offer its readers the best thinking

in the industry and in the nation on the answer to the question of further expansion, ROCK PRODUCTS has talked with dozens of cement executives and consulted numerous outside sources. Here, capsuled and summarized, are the results of that search.

## **Impressive Post-War Record**

Sometimes overlooked in the acute local cement shortages that have turned up in various parts of the country for several years is the fact that the cement industry expansion to date is well nigh incredible—especially for an industry so heavy, so complex, and requiring so much capital outlay.

During World War II, cement—as a so-called non-essential industry—couldn't obtain machinery



and materials needed to maintain and improve plants at anything like peak operating efficiency. But, before the war ended, the cement industry had launched an all-out improvement program to make up for lost time. As a result, the postwar rate of increase in annual output of portland cement has outstripped all other basic construction materials. At 100 million barrels a year in 1946, cement production was pressing 300 million barrels just ten years later. Each successive year since 1947 has seen a new all-time high in cement output. Surveys indicate that annual capacity will range between 335 and 375 million bbls. by the end of 1956.

This year, expansion is due to set another record, with 47 million barrels in new capacity to be brought into production. Recent expansion an-

nouncements point to a total output capacity of 400 million bbls. a year in the 1957-1958 period—almost double the capacity of the industry at the end of the second World War. The cement industry certainly has been alive to the growing need for portland cement.

#### **Factors Favoring Further Expansion**

In spite of this tremendous expansion effort, indications are that, as presently programmed, growth still won't be enough. Four principal factors point in the direction of further expansion.

1. **Population** is growing and will continue to grow. If the present level of birth rate continues, the 1965 population of the United States will reach 193.6 million people. Rising population means a rising direct demand for added shelter and an ever-

... Continued

## Cement Industry— Time of Decision

widening range of community facilities, factories, utilities, transportation and merchandising. That means more cement—and lots of it.

2. **The value of our national product** has been climbing steadily for some years and gives every indication of continuing that climb. Here's what two nationally-known economists have to say about this:

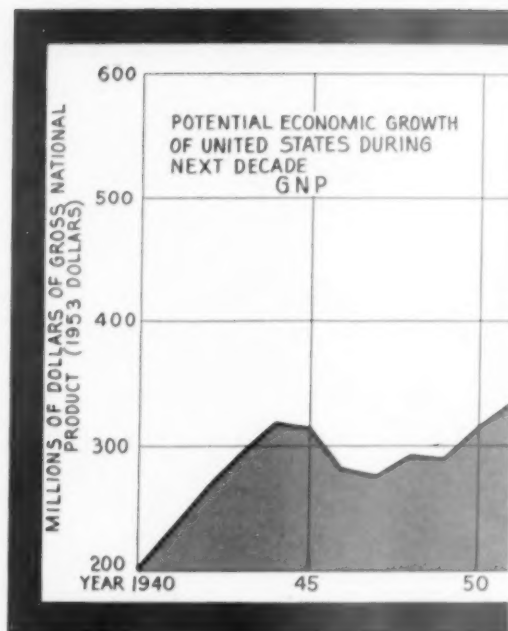
Sumner H. Slichter, Harvard University professor: "The evidence is convincing that during the next decade, the growth of production will be close to four percent a year, or about 40 percent—a gain of about \$185 billion in dollars of 1955 purchasing power, bringing the gross national product in 1965 up to about \$570 billion . . . Although one would not be justified in asserting dogmatically that the next ten years will be even steadier than the last nine, there can be no doubt that the economy is slowly gaining in stability."

Robert J. McFall, consulting economist: "Today's business does not manifest a boom. Actually, we have recovered about half-way from last year's downward adjustment . . . Over the long-term future, the economy will continue to grow 'stabilized' at the rate of an upward line of normal expectancy . . . As of 1965, the gross national product is likely to reach a half trillion dollars."

New construction accounted for about 5½ percent of our national income in 1946. In the ten years since, this ratio has doubled. In a period of rapid peacetime economic growth, total investment in new construction equals about ten percent or more of the gross national product. Thus, economists point out, a gross national product of \$500 billion in 1965 means a possible \$50 billion for new construction that year—a rate that exceeds the present annual rate by \$10.6 billion.

3. **Highway construction on a vast scale** is going to be with us for a long time to come. Every factor in our economy points to this. Highway building will likely compose the largest single element in the expanded market for portland cement concrete.

The new, aggressive federal roadbuilding pro-



gram will likely double the demand for cement in highway construction—a category which already accounts for one-fifth of total U.S. cement consumption.

A projection by *Sales Management Magazine* predicts that by 1965, Americans probably will be working a four-day week with the increased time and money for travel. Tourists will be able to drive from coast-to-coast without meeting a traffic light, and there will probably be in excess of 80 million vehicles (today there are 58 million) on the highways.

The acute need for more and better highways is certain to mean a big backlog market for the cement industry.

### Factors Against Expansion

We've looked at the rosy side of the picture. Now let's examine two of the factors that tend to hold back further cement expansion.

1. **The cost of new cement capacity** is almost



stratospheric. Ten years ago, a new million-barrel cement plant could be built for about \$6 million. Today, it costs more than twice that much.

In speaking before the Associated General Contractors of America earlier this year, H. A. Sawyer, president of Lone Star Cement Corp., said:

"A good way to get a comparative idea of the cost of providing increased cement productive capacity is to take it on the basis of the cost of providing a job for each man in the plant or factory. For U. S. industry as a whole, this is something

H. A. Sawyer (in his A.G.C. speech) says: "Any way you approach this problem of the outlook for the construction industry, this year and for the years ahead, you are bound to come up with optimistic answers — because America has to build in order to progress, and we have to progress at a greater rate than any other competitive economic system in order for our system to endure and prevail in a world now in ferment. We are confident in the future of the construction industry and in the steadily expanding use of portland cement on the basis of inherent merit for all classes of construction."

Charles B. Baker, president of Universal Atlas Cement Corp. (speaking at N.R.M.C.A. convention this year); "Only a very substantial and long-continued increase in the use of concrete in the United States can support such additional productive capacity in the cement industry. Like everyone else these days, we at Universal Atlas have made detailed long-range forecasts of our markets, present and prospective. Based upon our studies, it is our belief that increases in cement productive capacity of the magnitude described are justified by the long-range market potential for our products."

There is certainly no unanimity among industry leaders on the expansion question. Feeling seems to break down into three rather broad groups: (1) let's keep growing; we can't miss; (2) The immediate expansion was justified, but more may be dangerous. Let's wait and see; and (3) the industry has expanded too fast and too far.

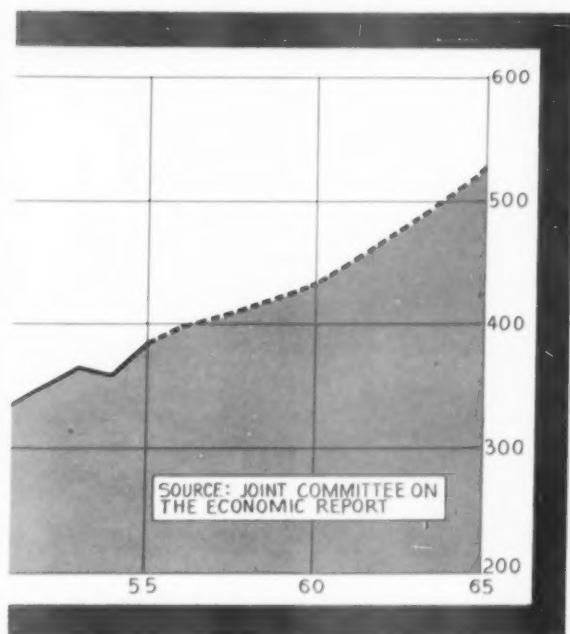
Among the first group, a vice-president of a large eastern company told me: "We have an obligation to meet the demands of our customers. We are not now meeting them fully, and we should continue to expand until we do."

Similarly, a vigorous young executive in one of the smaller companies said: "Over a long period of time, **every** industry is overproduced. We must continue to grow. Even if we overproduce and get on top of demand, the constant increases in population and per capita use will catch up with us again and we'll hit another shortage period. Other industries have gone through these same shortage pains many times. There will be more expansion if we need it."

The middle-of-the-roaders like such phrases as "passing demand", "effect of present expansion" and "obligation to our stockholders." This group also stresses two aspects of cement consumption basic to thoughts of further expansion; the regional nature of cement demand and the periodic abnormal demands which can create artificial shortages.

One president of a medium-sized multiple-plant company pointed out that "cement is primarily a regional business and we have to think pretty strictly about what is happening and what is going

(Continued on page 214)



like \$15,000; in Lone Star Cement it is today \$50,000 to \$60,000, or almost four times the national average."

2. **Desire to wait and see** what present expansion program will bring. Many cement executives feel that the current huge expansion is a little precipitate. Even those who don't share this feeling are inclined to take another close, hard look at the cement market **after** the new capacity is in operation before deciding whether or not to expand further. The almost headlong expansion has now subsided somewhat, even though much of the capacity involved is not yet in actual production. Once it is, expansion talk will flourish again if cement shortages continue.

#### What Industry Leaders Say

Several cement-industry leaders have declared themselves publicly on the question of further industry expansion. Others are willing to express their views privately. Here are several comments:

Looking toward firing end  
of No. 2 kiln



# A Dust-free Plant In the Middle of

**C**ALIFORNIA PORTLAND CEMENT Co. is now operating a \$12,000,000 dry-process plant in the middle of the Mojave desert. Completely isolated from any sizable communities, the Mojave plant at Creal, Calif., embodies the most modern dust collecting equipment. Every conceivable source of dust—including vibrating screens, belt conveyor and related transfer points, crushing units, etc.—has been enclosed.

Already planning a 150 percent capacity increase, the plant has installed electrical precipita-

tors which alone cost as much as a complete portland cement plant would have cost a few decades ago. The precipitators on the two rotary kilns are of such capacity and efficiency that stack dusts are barely visible. Safety has been stressed in plant design and in operational practices.

Clinker was first burned last December, and the staff had hardly gotten the plant running at peak efficiency when it was announced that the operation was to be expanded from 7000 to 17,500 bbl. per day through the addition of three kilns and



# A Desert

several raw and finish grinding mills. Additional proportioning, kiln feed, and finished cement silos and crushing units will be included.

The present buildings were located on an exceptionally large plant site to facilitate future expansion. Engineers are now making plans for plant enlargement (completion expected late in 1957) which will put the Mojave plant in a tie for third place among United States cement producers.

All materials are transported in the plant by belt conveyors, bucket elevators and screw con-



Dust collectors for final crushing and screening, to the left. Minus  $\frac{1}{4}$ -in. stone from scalping screen is carried by belt conveyor to conveyor serving storage building

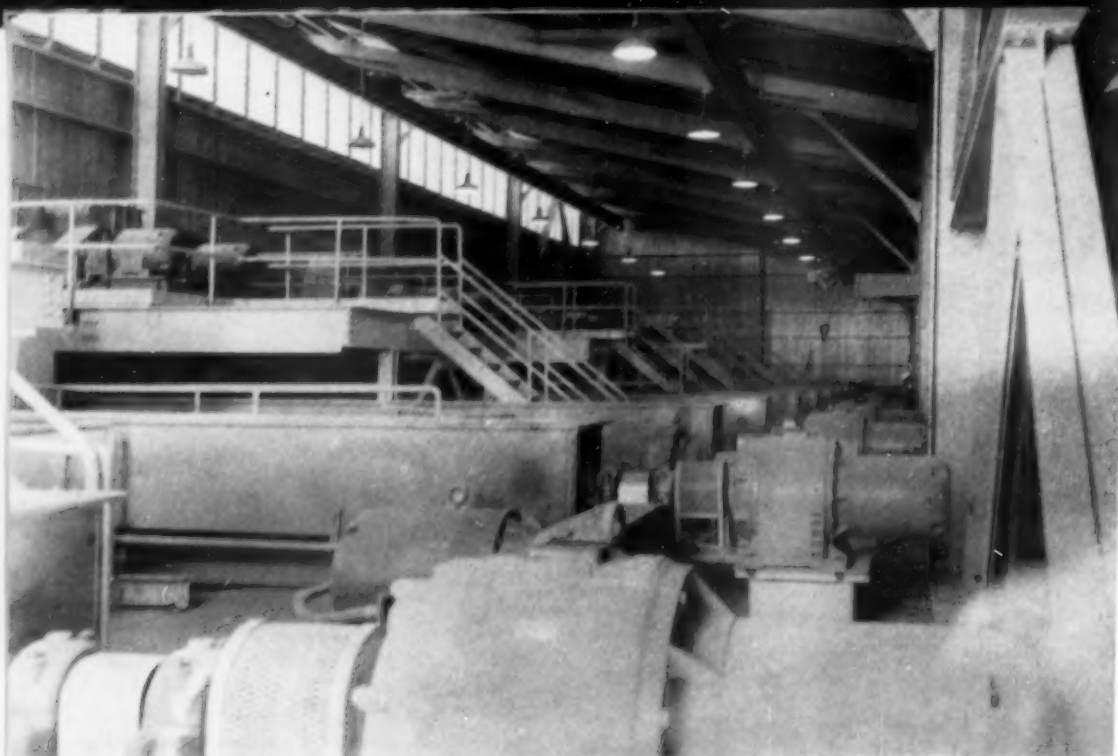
By WALTER B. LENHART

veyors. Bucket elevators are heavily constructed, using steel bucket-lines; they are driven through suitable gear reduction units. Signaling devices indicate to the mill men the operation of the unit. Use of bucket elevators and screw conveyors at the new mill was based on their favorable operation at the company's Colton plant.

Exploration work in the Mojave area was carried on extensively by the laboratory and geological staff of the California Portland Cement Co. Large deposits of high calcium limestone, as well as suitable shale beds, were proven by this work. Deposits are located at elevations higher than the plant; they are from 1000 ft. to three-fourths of a mile distant. Access roads to the deposits are of such easy gradients that cars can travel them in high gear.

The two deposits being mined are quite different in their physical characteristics. The deposit closer to the plant is a softer material, and is somewhat brecciated. Fragmentation from conventional well-drill blasting is excellent; the two  $4\frac{1}{2}$ -cu. yd. diesel-electric shovels can load the material almost without secondary blasting. Strippings are loose shale and of suitable grade and quality to meet the exacting requirements of the plant.

An "In-The-Hole" drill is in use on the property. This air-driven percussion unit drills a  $6\frac{1}{2}$ -in.



**Top floor of mill building.** Screw conveyors deliver mill product to air separators



**Elevator, center,** delivers blended and proportioned feed to constant head tank from which it is taken by screw conveyor, below, to the kiln

hole. A cross bit with a shank about 6-in. long is used, and the entire mechanism is lowered into the drill hole as drilling proceeds. Long, hollow drill stems are added as needed; they also are lowered into the hole with the mechanism. Since the hollow drill stem only serves to transmit air under pressure to the drilling unit, no energy is lost due to the use of a long drill stem. An air compressor is a part of the mobile equipment, and one man should operate the entire rig. The drill is rugged, and reports indicate that the skill of the operator need be no greater than for similar types of heavy drills. With the new drill, holes are sunk at the rate of 20 f.p.h. It is a dry drill, but adequate dust-protection equipment is provided.

The second and more distant quarry is near the top of a high prominence, which is on the contact between calcareous and granitic rocks. On the west side of this peak, the granite is a slab-like structure of nominal thickness and length. It is being removed and used as fill material for what eventually will be a quarry working level. As a part of this preliminary quarry operation, a "coyote" or tunnel shot is being prepared. The shot in the coyote tunnel, when completed, will push the granitic material over the side of the hill, and at the same time will serve as a primary shot for limestone.

The coyote hole is somewhat "L"-shaped, the



shorter leg of the tunnel starting at the portal. Jackhammers are used for drilling in the 3½- x 6-ft. tunnel, and muck is removed with a slusher powered by a tugger air hoist. At the turn or elbow in the tunnel, an unusual device is used to permit the scraper to make the turn when either loaded or empty without manual attention. A fan and a portable compressor complete the mining equipment in use at the coyote tunnel.

From the portal, the tunnel passes through the granitic material and a few seams of metamorphic rocks, then into the limestone. It turns 90 deg. to the south and remains in limestone. Farther south at the same elevation and outside the tunnel area, the whole face of the mountain is highgrade limestone. At the time of inspection, two crawler-mounted wagon drills were drilling in this part of the quarry. Air for drilling is provided by two 600 c.f.m. portable compressors. Prior to shooting the tunnel blast, the wagon drills will put in toe holes around the rim to assist coyote shot.

The limestone in this upper area is exceptionally high grade. It is a hard, crystalline, marbleized, metamorphic rock that tends to break into blocks. Four 35-ton capacity rear-dump trucks haul rock and shale to the primary crusher.

**Blending starts at the quarry** and stone is delivered to the primary crusher in a sequence that makes a rough chemical grade alignment—blend No. 1.

The 250-hp. primary crusher is covered, and trucks dump directly into its 84- x 66-in. jaw opening. This crusher feeds minus 10-in. stone to a 150-hp., No. 9 gyratory crusher. Crushed product is minus 4-in. stone, which is fed onto a 42-in. belt conveyor.

A magnet for removal of tramp iron is mounted over and at the discharge end of the 42-in. belt. The large wound magnet functions through the lower side of the short belt, collecting magnetic material and carrying it toward a small hopper. Collected metal drops into a hopper when the belt moves it beyond the range of the magnet. The 42-in. belt feeds to a vibrating scalper ahead of a 600-hp. impactor hammermill. Stone from the impactor is belt-conveyed to a ¾-in. single-deck vibrating screen (located in a separate building), the plus ¾-in. size being recirculated through the impactor. The minus ¾-in. rock from both scalper and screen goes over a long, totally enclosed belt conveyor to the raw-rock storage building. The crushing plant has a capacity of 350 to 400 t.p.h. It operates on the day shift only. Two separate systems collect dust produced during crushing, and collected dust is returned to the circuit.

**The rock and clinker storage building** is divided into several sections. One end is for clinker and gypsum and the other for limestone, shale and

George A. Moyle, general superintendent



iron ore. Spanning the building is a 16-ton capacity overhead, traveling crane with a clamshell attachment. The storage building is open at both ends, and the areas immediately adjacent are void to allow space for future expansion.

The limestone end of the storage building is divided into four separate compartments. They are open at the top and extend at right angles to the long axis of the building across the width of the structure. The belt conveyor from the final crushing plant parallels the long axis of this part of the building. A tripper unloads the belt into the end of any one of the four compartments. This is blend No. 2.

Blend No. 3 is made by the clamshell operator who picks up a bucket full of material and spreads it in a thin layer over a bunker. By superimposing layer upon layer of raw material, a vertical section represents an average for the entire bin. Beginning at one end, the clamshell operator loads the thoroughly mixed material into one of the "Feed-Out" bins.

Near the center line of the building and at right angles to its long axis, the building is divided in half by seven open-top feed-out bins arranged in a straight line. Occupying the full width of the building, the bins store material as follows: bin No. 1, clinker; No. 2, either clinker or limestone; No. 3, gypsum; No. 4, iron ore; No. 5, shale; No. 6 and No. 7, limestone.

Two parallel, enclosed tunnels, with belt conveyor in each, are installed below the row of feed-out bins. Seven continuous-type automatic weighing devices—all Feedoweights—are installed in the plant. Calculated amounts of clinker and gypsum are delivered onto the first belt. Limestone, shale, and iron ore also are weighed and delivered

to the second belt, which feeds the two raw grinding mills. The Feedweight under bin No. 2 (bin used as a spare) can deliver material to either belt.

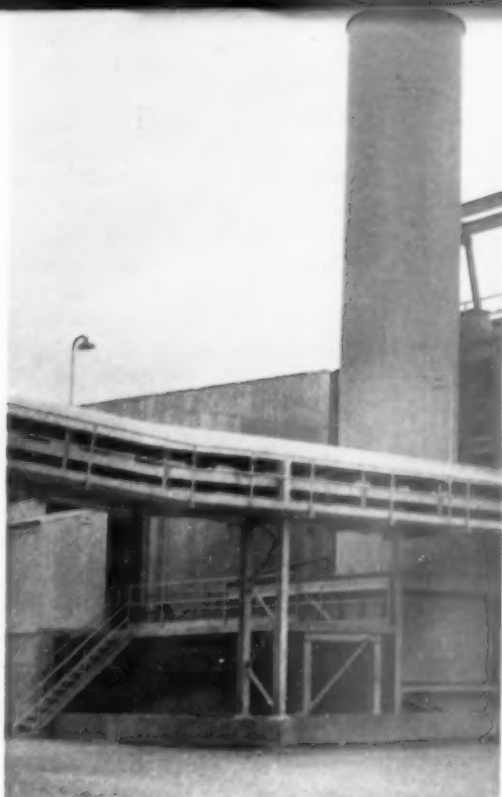
The mill building is a multi-floored steel structure. All raw and finish mills—identical in size, horsepower and make—are installed in a single row in one room. The two raw mills are at one end and the three finish mills at the other. Spanning the room is an electric crane. Future expansion has been anticipated by providing adequate ground space at both ends of the building.

The 10½- x 17-ft. ball mills operate in closed circuit with two 14-ft. separators on each mill. Each is powered by a 1000-hp. synchronous motor, and the raw mills grind 60 t.p.h. to 90 percent minus 200 mesh. A long screw conveyor returns ground raw material under the raw storage area and delivers to a bucket elevator just outside the storage building. The material is then conveyed to one of 16 proportioning silos. A hotel-type, self-operated elevator is one of the features of the mill room, and a similar elevator is provided at the finish cement silos. Electrical control panels and flashing signal lights are provided in the mill room.

The control laboratory, by making a chemical analysis of the materials in the various storage compartments, can proportion accurately the various ingredients so as to prepare the kiln feed for the types of portland cement desired. The blend flows into an empty proportioning silo until that particular silo is filled. Automatic samplers, made by the company, secure a continuous sample of material going to the silos, and this sample is completely analyzed. The proportioning silos are arranged in two rows of eight; each silo is 18-ft. dia. and 51-ft. 10-in. high, and each holds 350 tons.

Ground material is delivered from the proportioning silos to any one of the six kiln-feed silos. Rotary valves driven by variable speed gear-head motors feed the material to its off-bearing screw conveyor. Since a complete analysis is available of the materials in the several proportioning silos, a final blend can be obtained by using the variable speed motors on the rotary valves. This final blend and the several mixes that are obtained by the interchanging use of the screw conveyors, elevators, silo filling and emptying gives a kiln feed practically constant in mineral content. Frequent kiln feed samples are uniform, and are within the limits of analytical accuracy. The kiln-feed silos, 30-ft. (I.D.) and 51-ft. 10-in. high, are arranged in a single row.

Feed to each of the two rotary kilns is through a constant head tank or bin mounted above the kilns. Any overflow from the constant head tank is recirculated. Kilns are fed by a small, tight-fitting screw conveyor. The speed of this screw is synchronized with the kiln's speed.

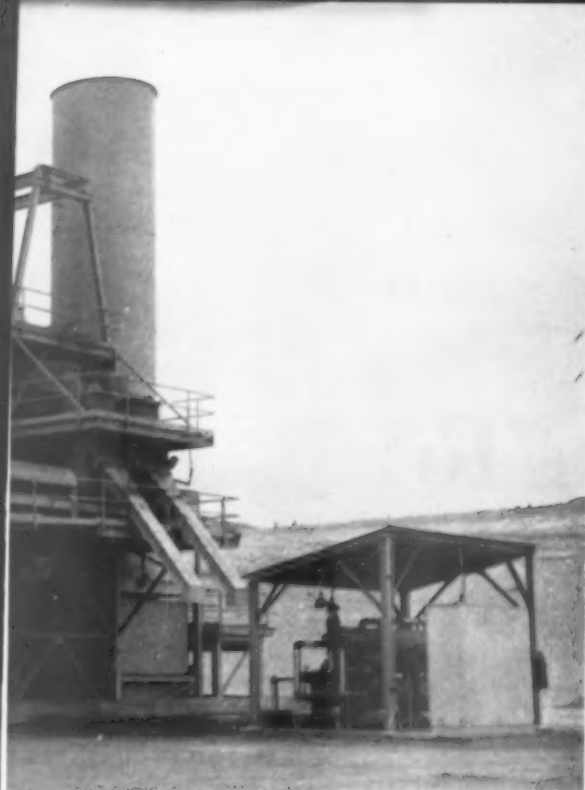


Stacks are part of the clinker cooler assemblies

Rotary kilns are 11- x 12- x 350-ft. and have been painted white. Each is provided with a 7- x 41ft. grate-type cooler. Natural gas is used for fuel and kiln dust from the Multiclones and electrical precipitators is returned to the kiln feed screw. Any excess dust is trucked to waste. Basic lining is used in the burning zone; alumina brick is used for the remainder. Each kiln is driven by two 60-hp. motors, one on each side of the ring gear. The kiln operates smoothly with the two motor drive.

A pressurized control panel is located on the burning floor. It features indicating and recording instruments for all phases of the kiln, cooler and precipitator operations. Included in the control panel are:

- Cooler pressure indicators
- Clinker cooler temperature recorder controller
- Clinker cooler bed speed control
- Kiln feed r.p.m.
- Kiln speed r.p.m.
- Cooler bed r.p.m.
- Cooler stack pressure controller
- Hood pressure recorder
- Kiln end temperature recorder
- Precipitator inlet temperature recorder controller
- Multiclone inlet temperature recorder controller
- Regulated air pressure valve
- Oxygen analyzer controller



gypsum are delivered to three finish mills that are identical to the raw grinding units. Each finish mill grinds 125 bbl. per hour at specified fineness. During the day shift, some of the finish mills are inoperative but resume grinding when the crushing plant closes for the day. This method prevents a high power peak.

**For cement storage**, eighteen 30- x 83 $\frac{3}{4}$ -ft. silos are available, arranged in two rows of nine silos each. Each silo holds 10,750 bbl. Cars can be loaded on both sides of the storage units. A "Modern" 4-tube packer, used for sacking cement, is mounted several feet above the main floor. Bagged cement falls from the machine to a woven wire belt conveyor that delivers it to the loading doorway. Hand truck operators place the sacks in cars or on trucks. Bulk trucks are weighed as loaded from three small truck-loading bins. A screw conveyor under the bins permits trailer and truck to be loaded while on the 60-ft. long scale platform. Paper bags are stored in a building alongside the 4-tube packer and at ground elevation. A forked lift truck is available to lift empty bags to the packer. Rail shipments leave via Southern Pacific Railroad.

Other buildings at Mojave include two garages (one for company trucks and one for trucking contractors), a well-equipped repair shop and a modern office and laboratory.

Rock storage capacity is 20,000 tons, and 203,000 bbl. of clinker may be stored. Additional room is available for storing 3700 tons of gypsum, 10,500 tons of shale, and 6800 tons of iron ore. Stand-by oil storage tanks are provided, and two water tanks hold 500,000 gal. Tractors are available for quarry, road work, and for use in the rock storage building.

**The company** has another cement plant at Colton, a community some 60 miles due east of Los Angeles, to serve portions of Los Angeles and the southern part of the state. The Mojave plant supplies the northern and western part of Los Angeles and the southern end of the San Joaquin Valley, including such cities as Bakersfield. The valley areas are rich in oil, mineral and agricultural wealth. The Arizona Portland Cement Co., Rillito, Ariz., between Tucson and Phoenix, is a totally owned subsidiary of the California Portland Cement Co.

**Engineering work** for the Mojave plant was done by Donald R. Warren Co. L. E. Dixon Co. was the prime contractor, and R. G. Patterson was company's engineer in charge of construction.

The main offices of the California Portland Cement Co. are in Los Angeles. E. E. Duque is president of the company. George A. Moyle is plant superintendent, and O. L. McCain is chemist of the Mojave plant.



Four of the proportioning feeders in tunnel

Kiln lining temperature recorder  
Fuel oil flow controller (if oil is used)  
Fuel gas flow controller

Each kiln has its own bank of instruments. In the center of the main panel are six indicating ammeters for the motors on feeders, fans, kilns, coolers, and clinker breaker. Push buttons on this panel are for motor control purposes.

Clinker from the coolers is returned to the east end of the storage shed from which it is supplied, as needed, to the clinker feed-out bin. Clinker and

## Ike's Highway Program

# What it Means to The Cement Industry

By G. DONALD KENNEDY

President, Portland Cement Association

SEVERAL WEEKS AGO, the Congress of the United States passed a long-awaited and sorely needed \$33 billion highway construction bill. The United States now has a planned, unified program to reopen its highway frontier.

In the elation of seeing this important legislation at last enacted into law, the rock products industries must never lose sight of a corollary to the highway bill: the tremendous responsibility it places on all concerned with roadbuilding to supply the materials, manpower and knowhow to implement this long-range program.

Congress has done its work, and done it well. The Act of 1956 is a good one, and the machinery has been set up to generate the necessary funds to pay for it. The men most responsible for creating and supervising passage of this important legislation deserve special credit for performing an important public service. The spotlight now shifts to the engineering and construction fields. We have the mandate and the opportunity to carry out the letter of the highway act so that every citizen can benefit. It's a great challenge, but one I feel certain can be met.

The highway job, reduced to its simplest elements, is to:

- build up a 41,000-mile National System of Interstate and Defense Highways reported by state highway officials in 1954 to be 75 percent below standard;

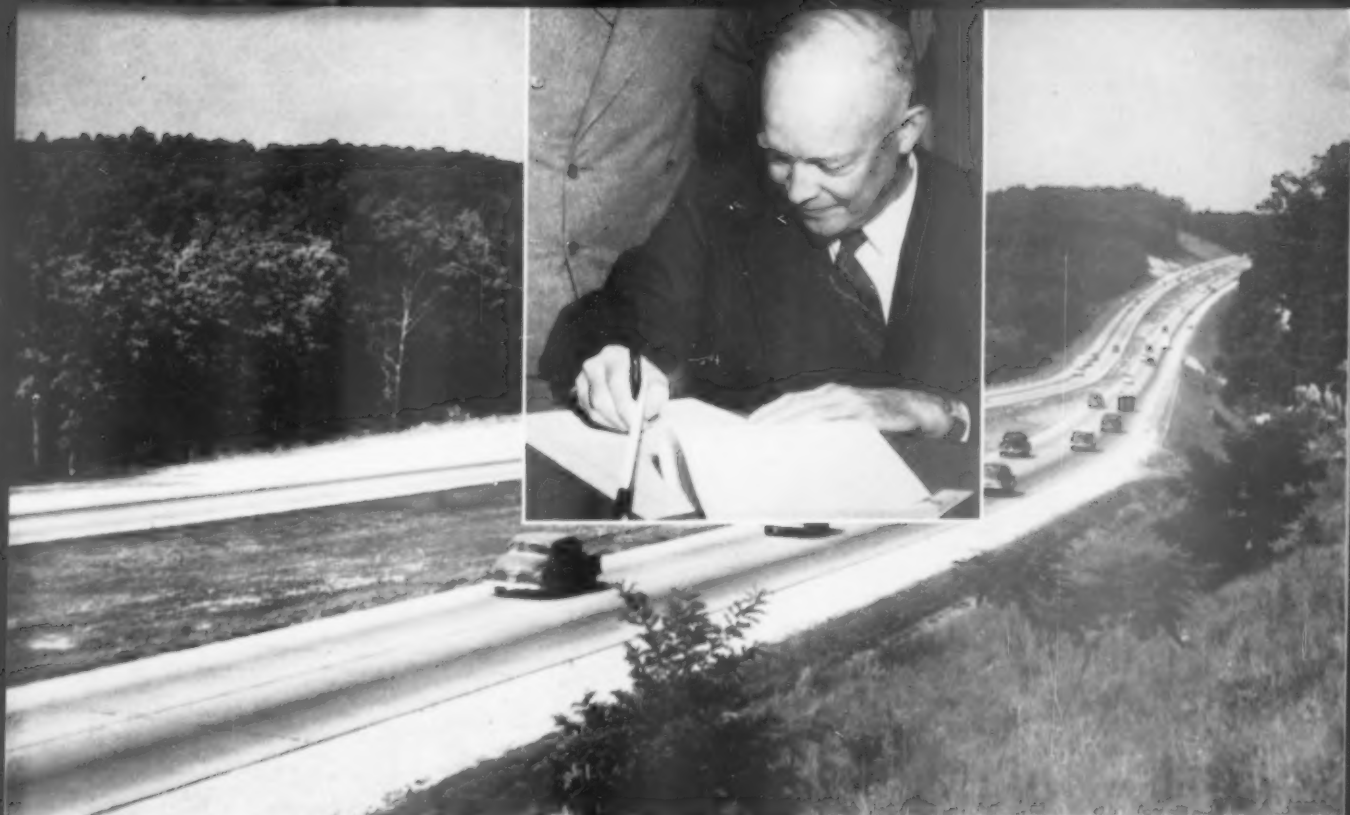
- rebuild a 234,000 mile Primary Highway System that was 69 percent deficient in 1954;
- improve a secondary road system that is only 25 percent adequate;
- and modernize 50 percent of the mileage of local roads and city streets.

To do all this, state highway officials estimated will cost \$101 billion. It was unfortunate that this figure should have caught the public eye and been misunderstood. This was an estimate of the amount required to correct the deficiencies on the entire nation's network of 3,360,000 miles of roads and streets. This estimate was never intended as a proposed Federal-aid program, but it was mistakenly associated with new federal highway legislation.

Still, the recently passed highway act is a giant step toward meeting these needs. In size and scope it far surpasses any construction program ever undertaken by the United States. In fact, with the exception of World War II, it surpasses any single previous project. Unbelievable? Consider this: the Panama Canal cost \$366.7 million; the total investment in the Tennessee Valley Authority, including income from its operations, has amounted to about \$3 billion in its entire history; and the combined cost of WPA and PWA was some \$15 billion.

Anticipating expanded federal highway legislation, the American Road Builders' Association conducted an intensive examination of road build-





Signing the \$33 billion highway bill, President Eisenhower set in motion the biggest construction program in history

ing capacity in this nation. In general, they reported that America's roadbuilders have the capacity to double the volume of highway construction in the next few years—including a prediction that materials producers and equipment manufacturers will be able to supply all potential highway needs in addition to the booming demands of all other construction.

**Four groups must work closely together** to meet the challenge posed by the expanded highway program: highway engineers, materials producers, construction contractors and equipment manufacturers. Let's examine these categories briefly on the basis of the ARBA report.

New, young highway engineers are in an acute shortage. But the ARBA feels that this shortcoming can be alleviated through increased productivity of the experienced engineering staffs now available. Says the report: "Action will be needed to increase engineering productivity . . . and to streamline methods and procedures now employed to plan and design projects. Much progress has already been made towards these ends, and more will be forthcoming . . ."

Construction contractors, the ARBA reports show, are immediately able to take on a greatly expanded highway building program. Questionnaires returned by more than 3,000 contractors indicated that they worked at only 49 percent of

their estimated capacity during 1955, when contract construction accounted for \$3.6 billion of the \$4.6 billion spent on highways. According to the ARBA a highway program of \$8.8 billion could be carried out this year if existing contractor capacity were utilized in full. They further estimate that this capacity could be expanded to support a \$10.8 billion program a year from now, an \$11.9 billion program in three years, and a \$12.3 billion program in five years.

Of equipment manufacturers, the report states flatly: "The construction machinery and allied equipment industry is confident of its ability to satisfy whatever equipment needs arise from a high level highway construction program which is deemed essential to the nation's economy and at the same time fill all normal requirements of other claimants for the industry's products."

Materials requirements for roadbuilding, according to the ARBA report, for each \$1 billion increase in spending above the \$4.6 billion-a-year rate of 1955, will include these added amounts of supplies:

Cement	16,564,000	bbl.
Aggregates	76,415,000	tons
Steel	510,000	tons
Bituminous material	995,000	tons
Petroleum products	122,794,000	tons

In April of this year, the Bureau of Public Roads issued its estimate of total highway and street dis-

... Continued

## Ike's Highway Program



Segregation of traffic by clover-leaf intersection construction will promote safety

bursments in 1955. Capital outlays totaled \$4.8 billion, compared with its earlier estimate of \$4.6 billion used by ARBA. These expenditures, less \$78 millions of federal funds not classified by sys-

tem, are shown in the table below on the left-hand side. On the right-hand side, are estimated expenditures for the same categories in the fiscal year 1960, the peak year of the 13-year roadbuilding program.

1955 Expenditures	Road System	Expenditures at peak of new program (fiscal 1960)
\$3,695,000,000	Interstate	\$2,444,000,000
	Other Federal-aid systems	1,800,000,000
	State non-Federal aid	2,400,000,000
554,000,000	County and local	800,000,000
491,000,000	Urban	700,000,000
\$4,740,000,000	Total	\$8,144,000,000

Thus there will be an additional expenditure of about \$3.4 billion for road construction in the peak year of the program. If one uses the ARBA estimate of 16.6 million bbls. of cement per \$1 billion of road construction, an additional 56,440,000 bbls. will be required in fiscal 1960. Since 61,342,000 bbls. were needed in 1955, a total of about 117,800,000 bbls. will thus be required to sustain the roadbuilding program of fiscal 1960.

The cement industry is in the midst of a tremendous expansion program, to meet this and other increased demands. At the request of several Federal agencies, during December 1955, the Bureau of Mines conducted a canvass of expansion plans of the cement industry within the continental United States. Cement companies were asked to report expansion plans under construction or to be finished within the next three years. The results of this canvass, as published by the Bureau in a supplement to its Monthly Cement Reports was as shown in Table 1. (Continued on page 89)

TABLE 1: REPORTED CEMENT EXPANSION PLANS.  
Capacity in thousands of barrels

Year	1st quarter ending March 31	2nd quarter ending June 30	3rd quarter ending September 30	4th quarter ending December 31
1955				311,499
1956	316,797	330,608	341,632	357,525 (2)
1957	370,637	373,641	375,536	381,136 (3)
1958	383,386	383,586	385,886	391,886 (4)

(1) Table does not include capacity of Puerto Rico plants. (2) 97 percent of 46,026,000 bbl. expansion under construction. (3) 52 percent of 23,611,000 bbl. expansion under construction. (4) None of 10,750,000 bbl. expansion under construction.



*Large mill hammers taken from the scrap pile needed a 2" to 2 1/4" build-up on length...required approximately 5 lbs. of Manganese and Stooddy 100, combined. Smaller amounts of build-up and hard metal are required for subsequent maintenance.*

## DON'T THROW AWAY 9/10 OF EVERY MILL HAMMER

The Victorville Lime Rock Company on the Mojave Desert some 75 miles from Los Angeles operates a plant for the reduction of high grade limestone that is processed for a great many uses, from face powder base to roofing materials. For intermediate crushing the company uses Williams hammer mills—and as usual, hammer maintenance is a problem.

When a Stooddy representative first called at this plant he found a scrap pile of worn hammers that had been discarded in favor of standard replacements. 9/10 of the hammer was still there but so severely worn as to have lost its efficiency. A set of nine new hammers represents an investment of approximately \$200.00, so the huge scrap pile, to the hard-facing specialist, had all the appearance of a gold mine.

Tests were undertaken to determine the cost of rebuilding such hammers; a copper form was clamped around the worn end to fix the shape and the finish length. Using the semi-automatic welder running Stooddy Nickel Manganese, the hammer was brought back to just under finish size, then peened and hard-faced on the end and corners with Stooddy 100.

The original experimental rebuilding job proved successful and the procedure outlined has now been established as routine. New hammers measuring 4"x5"x10 1/2" weigh 45 pounds. Between four and five pounds of Manganese and Stooddy 100, a high-alloy,

wear-resistant material, are required to bring a worn hammer back to size. The semi-automatic welding procedure is extremely fast, depositing three to six times as much weld metal as is possible by the manual method. After rebuilding, each hammer is carefully weighed and balanced for proper operation of the mill. As wear occurs in service, the semi-automatic welder is used to apply additional Stooddy 100 free hand to maintain hammer size and shape.

By the method described hammer costs are enormously reduced and the

mill's performance is considerably improved.

Further information on the hard-facing of all types of crushing equipment is provided by various pieces of Stooddy literature. See your Stooddy dealer (you will find him in the "Yellow Pages" of your phone book) or write direct.



*George Stone, Maintenance Superintendent, shows turn-table fixture which speeds welding. Forms surrounding hammers are copper, establish hammer size and height of build-up.*



*Other hard-facing includes these quarry shovel teeth. Points are rebuilt with Stooddy Manganese and hard-faced with Stooddy 100. Note the copper mold which shapes the point.*

### STOODDY COMPANY

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## IN CALIFORNIA . . . AND THE WORLD OVER

In this quarry at Colton, the powerful 150-B shovel with its 6-cu. yd. dipper has no difficulty in breaking through tough limestone.



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New front-end design, extra-strong construction, and advanced engineering of Bucyrus-Erie Ward Leonard electric excavators give owners that extra margin of output that pays off in profits.

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**Bucyrus-Erie Company**

South Milwaukee, Wisconsin





Thus, by the end of 1958, according to announced expansion plans of the industry, capacity will be 80 million barrels greater than at the end of 1955. This is considerably above the estimated 56 million barrels additional required for the highway program by fiscal 1960.

The ARBA Task Force on Materials, utilizing this Bureau of Mines survey reported that: "It is evident, therefore, that the known expansion of the cement industry will provide the cement needed for a relatively large expansion of the highway program by 1958 and for all anticipated requirements by 1959 or '60."

These published reports indicate that the portland cement industry fully intends to meet the challenge of the new highway program.

**What's Ahead Right Now?** How does the overall timetable look for this stepped-up highway program? Right now there is a \$19 billion backlog of highway work for which plans are partially or wholly completed. This work can be let to contract rather quickly, and should somewhat ease the pressure of the new program in its early stages. However, state highway departments face a major task in expediting their long-range plans. Currently, there's a lag of about 21 months from the time funds are authorized until construction begins.

TABLE 2. HIGHWAY CONSTRUCTION NEEDS  
1955-1964\*

Needs in Millions of Dollars			
Highway System	Rural	Urban	Total
Interstate	\$12,536	\$10,717	\$23,253
Primary, F. A.	19,889	9,993	29,882
Other state highways	3,735	1,765	5,500
Secondary, F. A.	10,076	4,907	14,983
Local roads and streets	13,278	13,908	27,186
Totals	\$59,514	\$41,290	\$100,804

\*As reported by State Highway Departments to the Bureau of Public Roads for use by the President's Advisory Committee on a Long Range Highway Program, 1954.

This will be shortened by new Bureau of Public Roads' procedures and by streamlining engineering methods, but it will probably still be a year and a half before highway projects initiated after passage of the new highway bill will be ready for construction. Pressure will continue to build up for another two years, at which time the program will be at a near peak. So, in general, there will be an increase in demand on the construction industry immediately to take care of the backlog; this should rise rather steadily as new building projects are initiated, and should level off at its peak by the summer or fall of 1960.

(Continued on page 212)

Four-lane divided concrete highway construction scene that will be typical of many projects carried out under the new program



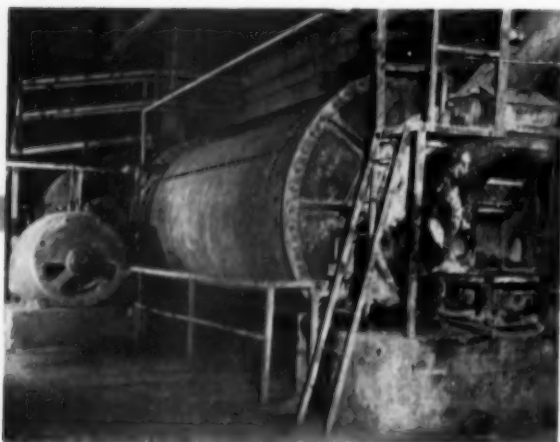
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KVS #48 GEARLESS GYRATORY CRUSHER



KVS 11'3" x 200' ROTARY KILN WITH GRUDEX  
PREHEATER SHOWN IN BACKGROUND



KVS 8' X 18' CLINKER GRINDING MILL



KVS 9' X 9' COAL GRINDING MILL

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**Uses less than 60 lbs. coal per barrel.**

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  - Pneumatic Transport Systems
  - Asbestos Plants
  - Complete Lime Plants
- Complete Cement Plants
  - Steam Generators
  - Complete Aggregate Processing Plants
  - Waste Heat Boilers
  - Pulverized Coal Firing Systems



TWO KVS DUAL ROTOR IMPACTORS ...  
 CUBER SENIOR, MODEL 3648



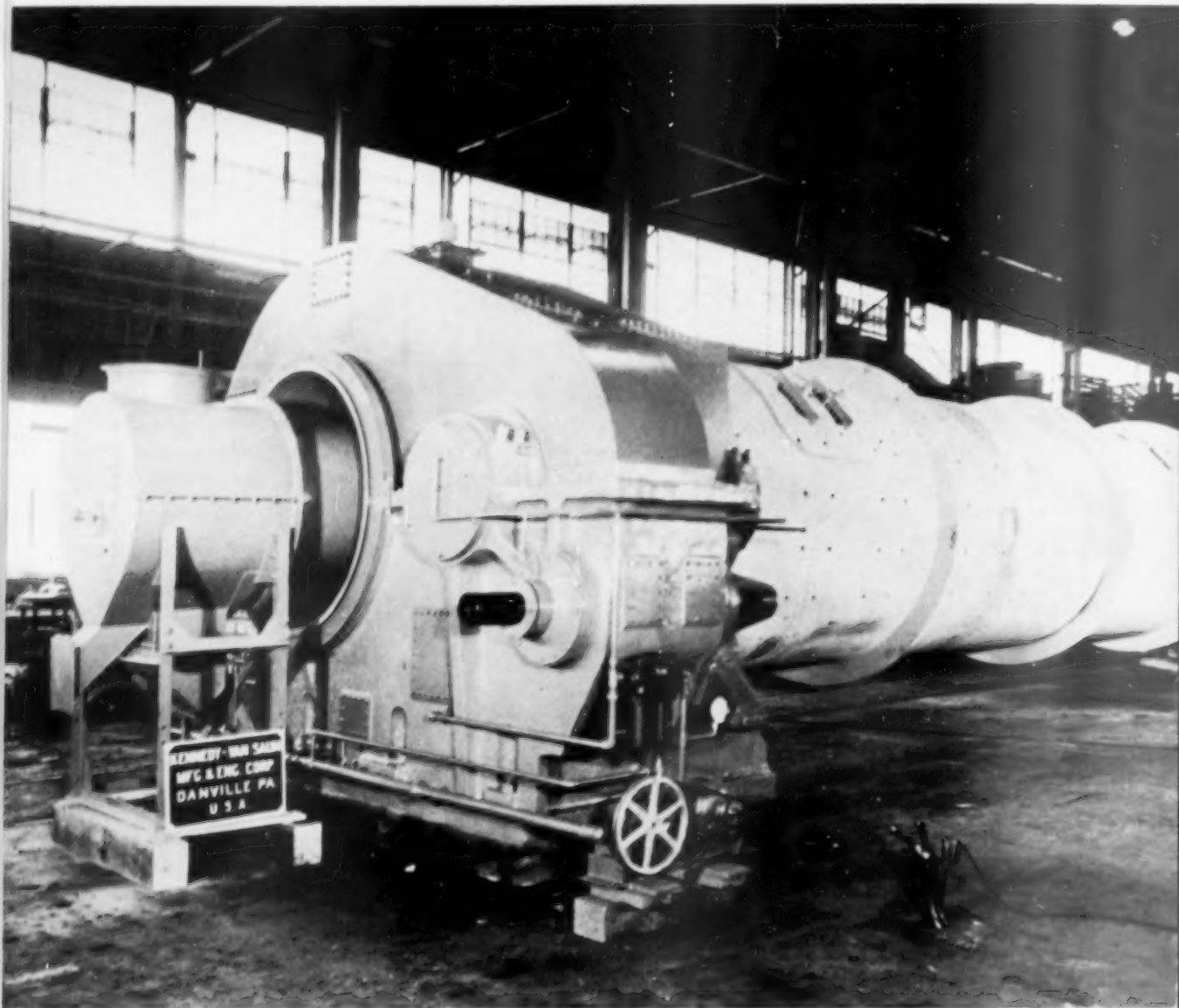
FIRING HOOD OF KVS, 11'3", 200 FT. KILN

**KVS Machinery & Equipment**

# **- VAN SAUN**

**TWO PARK AVENUE, NEW YORK, N. Y. • FACTORY: DANVILLE, PA.**

# KENNEDY GRINDING



ONE OF FIVE 8' X 36' KVS INTEGRAL GEAR DRIVE, 3-COMPARTMENT MILLS. BUILT FOR GRESIK CEMENT PLANT, ISLAND OF JAVA, INDONESIA.

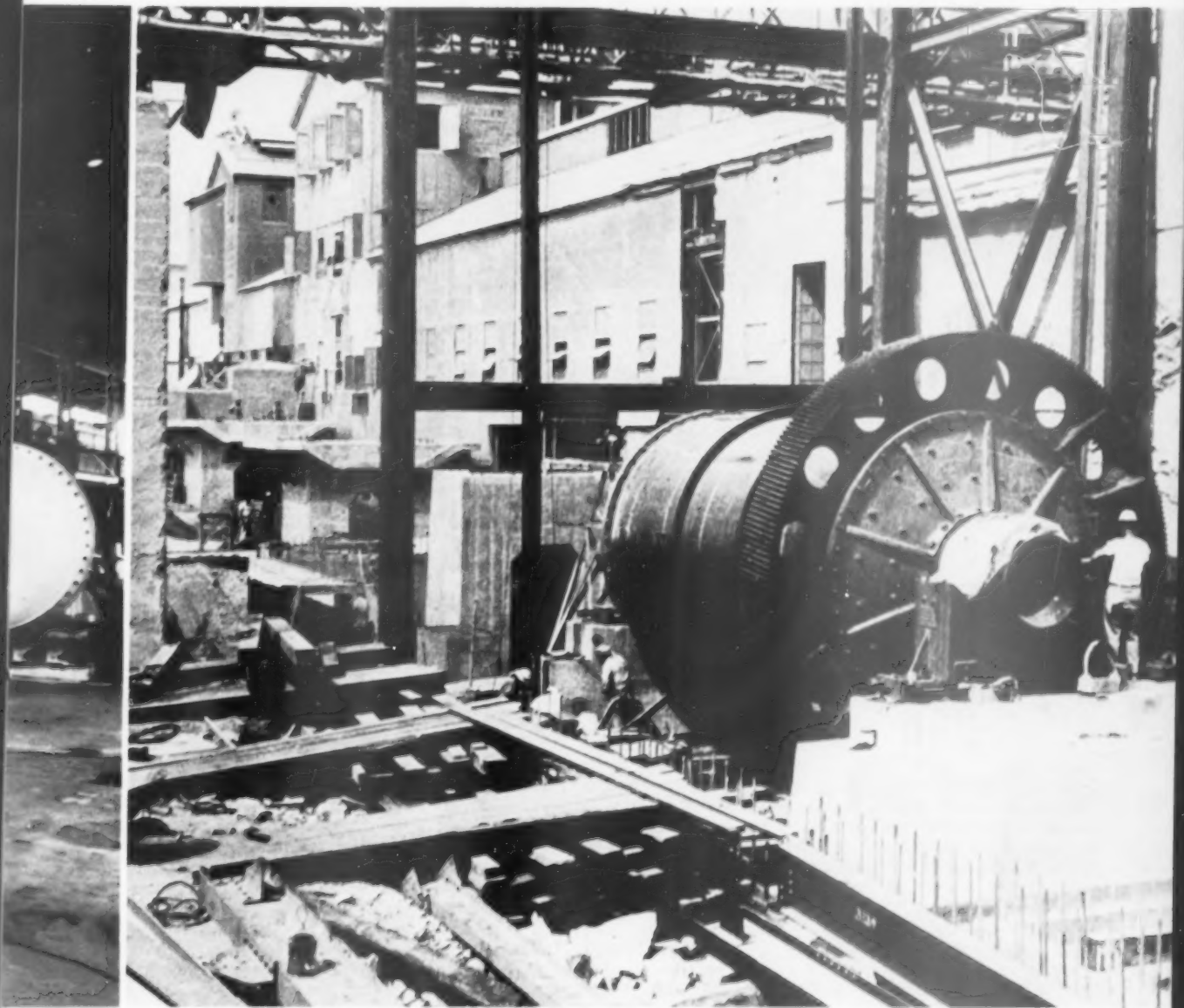
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11' X 20' KVS CLINKER GRINDING MILL, SINGLE HELICAL RING GEAR, INSTALLED AT PETOSKEY, MICH., PLANT OF PENN. DIXIE CEMENT CORPORATION.

# KENNEDY-VAN SAUN

MANUFACTURING & ENGINEERING CORPORATION  
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Car dumper and secondary crushing and screening buildings, to the left, clay wash mill in center background, and covered storage and mill buildings on the right

# Canada Cement's Largest Kiln Doubles Capacity of Ft. Whyte Plant

## EXPANSION PROGRAM

... provides for installation of a second 12- x 450-ft. wet process kiln in new plant for completion early in 1957. Old Ft. Whyte, Man., plant will then be only used to make special cements

By KENNETH A. GUTSCHICK

**S**IMPLICITY OF DESIGN, compactness, and high unit capacity are the key features of the Canada Cement Co.'s\* new wet-process cement plant at Fort Whyte (Winnipeg), Man. Based upon nearly a half century of experience in the cement industry, the company, in 1955, built what it considers the "ideal" wet-process plant.

The company has been operating a plant at Fort Whyte since 1912, first using the dry process, then converting

to the wet process in 1927. The older plant is producing 1,500,000 (Canadian) bbl. annually with two 10- x 278-ft. rotary kilns.

The new plant, adjacent to the original one, is of similar capacity, but incorporates only one kiln. It is complete with the exception of cement storage and packing facilities. For this purpose the company uses the old stockhouses, transferring the cement to them by Fuller-Kinyon pump. Conversely, the new plant supplies clay slip and minus  $\frac{3}{8}$ -in. limestone for

both operations. Stone is taken to the old plant from the new storage hall by a long 24-in. belt conveyor.

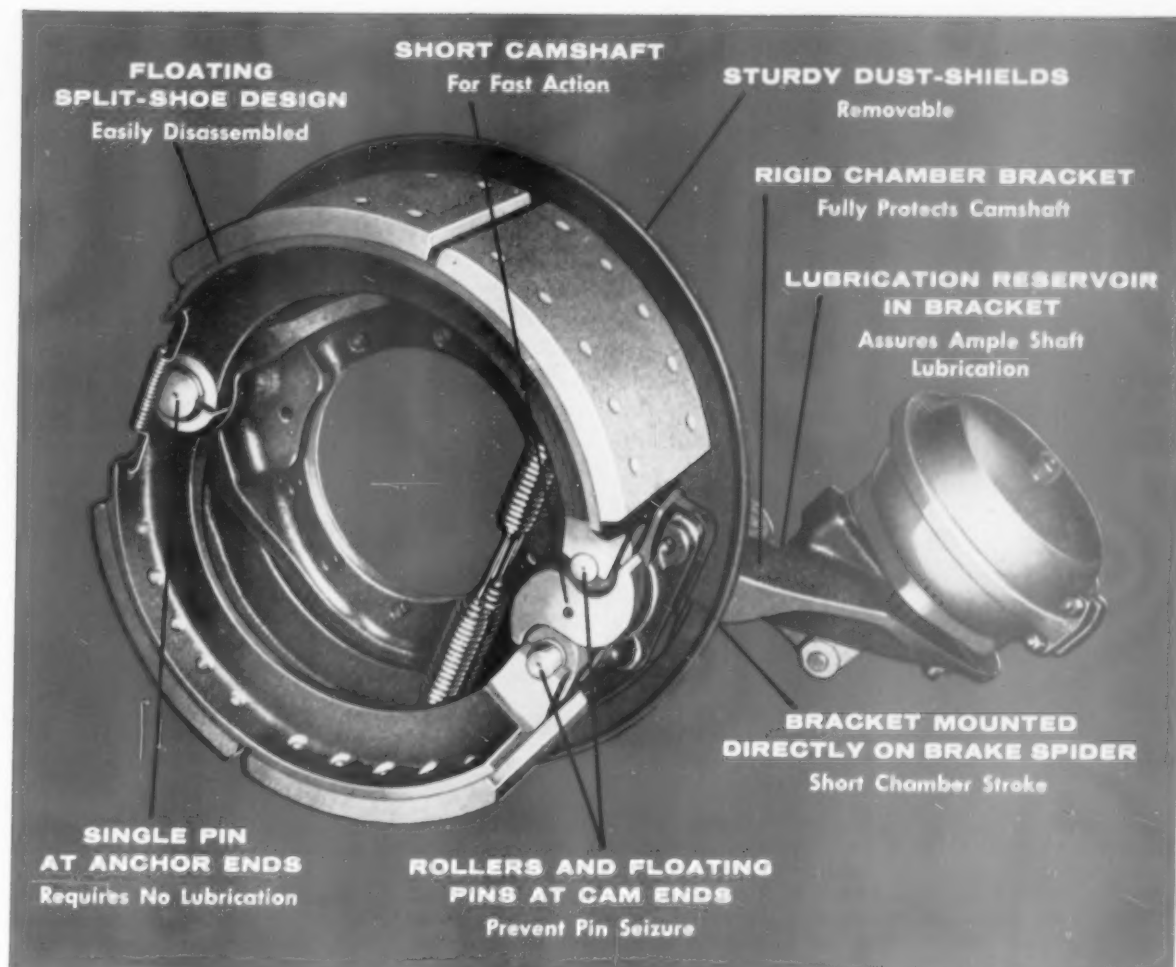
The new facilities are compactly arranged, as shown on the accompanying layout drawing. The covered storage area, used for all raw materials and cement clinker, is centrally located, with the mill building adjoining on one side; the slurry and clay basins, blending tanks, and kiln building on the opposite side. The original layout made provision for doubling

(Continued on page 96)

\*For a complete story of Canada Cement Co.'s multiple operations, see *Rock Products*, August, 1954.

Left to right: Covered storage area, clinker crusher building, blending and mixing tanks, and the discharge end of kiln building





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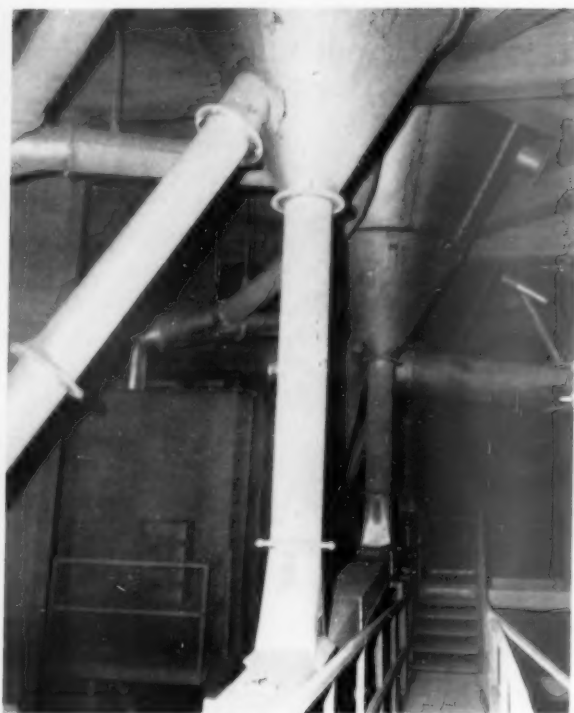


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**Screw conveyor** returning stack dust to kiln scoop feeder located 33 ft. below chain section



**Battery of 14-ft. air separators**, with tails returned by gravity to the finish mills, and finished cement dropping to Airslide conveyor

of capacity, a program currently underway.

The new plant, started up in July, 1955, incorporates an oil-fired 12- x 450-ft. Smidth rotary kiln. Producing 5000 (Canadian) bbl. per day, the kiln is the largest in the Canada Cement Co. system.\*\* It discharges clinker to a Narsted air-quenching grate cooler and is exhausted by dual draft fans through an electrical precipitator. Recovered dust is returned to the kiln by scoop feeder. Raw grinding is in open circuit, using two

8- x 46-ft. three-compartment Unidans and one 6- x 36-ft. two-compartment Unidan for preliminary sand grinding. Two 11- x 15-ft. ball mills are used for clinker grinding, each being closed circuited to two 14-ft. air separators.

In the present expansion program at Fort Whyte, the company is installing a second 12- x 450-ft. kiln, a second 110-ft. dia. slurry basin, and two additional 8- x 46-ft. Unidans and 11- x 15-ft. finish mills. In the secondary crushing and screening plant a second reversible impactor and new screens are being added. Completion of this project is scheduled for the spring of 1957, at which time the old plant will be used only

for producing such special cements as Kalicrete (Type V, sulfate-resistant).

**Cement raw materials** used at Fort Whyte include clay and sand obtained locally, high calcium limestone which is shipped in by 155-mile rail haul from a company quarry at Steep Rock, Man., and iron oxide cinders obtained from near Montreal. A typical mix consists of 20 percent clay, 74.8 percent limestone, 4.6 percent sand, and 0.6 percent iron oxide. Clay is handled through two Smidth 29½-ft. wash mills, the clay slip being pumped to the respective storage basins at each plant. All other materials are put through the secondary crushing plant before going to the covered storage area. This is especially necessary during cold weather operation, when the fine materials (sand and cinders) are partially frozen in this northern climate.

A wet pit ¾-mile from the plant supplies clay and also part of the process water for operation of both plants. The clay bed is 40-ft. thick, and is part of the glacial Lake Agassiz deposit that covers much of southern Manitoba; it is sticky and very difficult to handle. A 2½-cu. yd. drag-line excavates the material, loading to 12-cu. yd. side-dump rail cars. These are hauled to the wash mills in two 2-car trains by 15-ton Plymouth and G.E. locomotives.

(Continued on page 99)

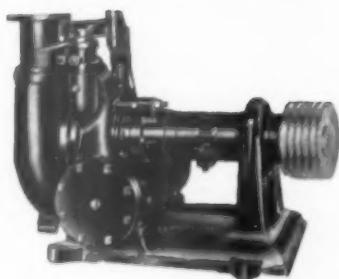
\*\*A 12- x 450-ft. kiln was recently installed at the company's Montreal East plant, and the new Woodstock, Ont., plant now under construction will have a 12- x 450-ft. kiln.



**Left to right:** C. W. Edmonds, superintendent; H. M. Burrows, plant engineer; J. M. Legate, assistant superintendent; S. Traves, chemist



# THIS MODERN HIGHWAY FLOWED THROUGH **WILFLEY** PUMPS!



Many tons of the Portland cement for this important link in the transcontinental highway system were produced using Wilfley Sand Pumps. Wherever Wilfley Pumps are used, the record reveals stepped up production and cost-saving efficiency. These famous pumps are synonymous with continuous, trouble-free, economical operation without attention. Let Wilfley solve your pumping problems. Individual engineering on every application. Write or wire for complete details.



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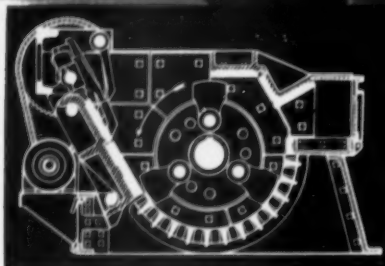
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**CRUSH  
POWER-SHOVEL-LOADED ROCK  
TO SIZES DOWN TO 3/4"  
IN ONE OPERATION !**



# **WILLIAMS SUPER SLUGGER**

**... CUT CRUSHING COSTS  
AS MUCH AS 50%!  
... REDUCE INVESTMENT  
AS MUCH AS 75%!**



Cross section of Super-Slugger equipped with "Pusher Feeder" non-clog device for maximum feeding of sticky or wet materials through crusher.

A Hammer Mill as powerful, big and rugged as they come! Takes stone as large as 2½ yard dipper can handle and crushes it with power-packed hammer blows to 2", 1¼" or ¾"—even down to feed size for fine grinding—in a single operation!

Capacities range up to 550 tons per hour.

One Super-Slugger will actually do the work of an ordinary primary crusher plus several secondary reduction machines—do it faster and better—and far more economically!

All expense of extra foundations, housing, conveyors or elevators, and drives, is entirely eliminated. Power requirements are much less. Exceptionally large shafts, extra heavy manganese steel liners and breaker plates, shock and wear-resistant reinforcing—all reduce upkeep and downtime, depreciation and wear to absolute minimums.

If you're in business for PROFIT, you can't afford NOT to know what the Super-Slugger can do for you!

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## **OTHER WILLIAMS EQUIPMENT**

HAMMER MILLS in many types and sizes for any requirement... ROLLER and IMPACT MILLS for fine grinding to any mesh, even to micron sizes... HELIX-SEAL HAMMER MILLS for dust-free grinding and for wet, sticky, greasy materials... DRYER MILLS for grinding wet materials down to 400 mesh... AIR SEPARATORS... VIBRATING SCREENS... COMPLETE PLANTS for crushing and grinding.

# **WILLIAMS**



**CRUSHERS**

**GRINDERS**

**SHREDDERS**

**OLDEST AND LARGEST MANUFACTURER OF HAMMER MILLS IN THE WORLD**

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Each wash mill is fed through a bar grizzly hopper, the bars being spaced on 12-in. centers. Throughs pass directly to the mill, while the coarse material is fed by means of a 3½-ton Provincial overhead crane, carrying a ½-cu. yd. digging bucket. The crane serves to break up the large lumps, thus extending the mill life; it is also used for clean-out purposes. The mills are driven at 10 r.p.m. by 200-hp. motors through Dominion gear reducers. Each mill is served by two 6-in. Wilfley pumps (one standby), which are driven by 60- or 75-hp. motors; these transfer the clay slip, at 68 percent moisture content, to the two plants. The larger motors are used for the pumps feeding the old plant, since the pipe line is 1100-ft. long compared to 600 ft. for the new plant.

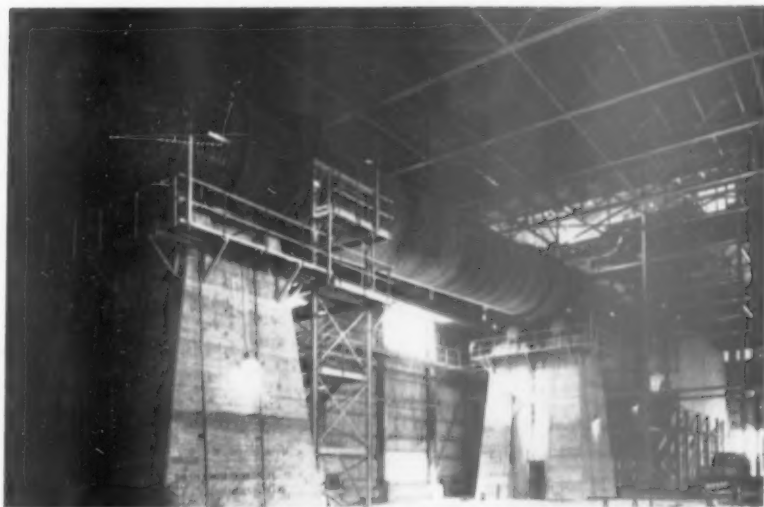
The reinforced concrete clay storage basin in the new plant, which is identical to the kiln feed slurry basin, is 110 ft. in dia., 20 ft. in depth, and has 2000-ton capacity. It has a traveling air-agitator, which makes one revolution every 3½ min. The agitator is supported on an 8-ft. dia. center pedestal and a 171-lb. circular crane rail mounted on the basin wall; two 15-hp. motors drive the agitator through gear reducers. Air agitation is supplied at 33 p.s.i. by a Fuller C-135 rotary compressor mounted on the agitator arm. A time cycle controller regulates the blowing of air through the numerous down pipes.

Clay slip is transferred from the basin to the mill building by a 4-in. Wilfley pump (one standby), where it is discharged to separate bucket feeder distribution boxes serving each raw mill. Transfer to each mill is via ferris-wheel feeder and 3-in. Wilfley pump.

The limestone quarry at Steep Rock is developed in the Elm Point formation (Devonian age), and the stone is crushed to minus 8-in. by a Fairmount single roll crusher prior to shipping. Additional crushing is not done at the quarry, in order to minimize rail car freeze-ups during cold weather operation. A typical chemical analysis of the stone is as follows:

CaO	53.40%
SiO <sub>2</sub>	2.00%
MgO	.66%
Al <sub>2</sub> O <sub>3</sub>	.54%
Loss on Ignition	42.00%

At the plant the stone is dumped into a twin steel hopper with a 60-ft. Wellman revolving car dumper, the unit being rotated twice to insure complete stone removal. Two variable speed 60-in. x 12-ft. Stephens-Adamson manganese steel apron feeders reclaim the material to short 48-



Feed end of 12- x 450-ft. kiln which is exhausted through electrical precipitator (in background). Scoop feeder for dust return is mounted on structure to right of drive pier, to the left

in. belt conveyors, which in turn discharge at right angles to an inclined 42-in. conveyor, 285-ft. centers, leading to the secondary crusher building. The crusher is a Pennsylvania CF 15-50 reversible impactor driven at 900 r.p.m. by a 600-hp. G.E. induction motor; it handles in excess of 450 t.p.h. The unit is operated in closed-circuit with two totally enclosed 5- x 14-ft. Dillon single-deck screens, the screens being fed by a 36-in. conveyor, 171-ft. centers, with the oversize being returned by a 36-in. conveyor, 174-ft. centers. Minus ¾-in. material from the screens is transferred to the centralized storage area by a 42-in. conveyor, 340-ft. centers, followed at right angles by a 42-in. motor-propelled S-A tripper, 432-ft.

centers. Norblo bag-type dust collectors vent the crushing and screening buildings, the collected material returning to the circuit. Provision has been made for doubling stone plant capacity through installation of a second crushing and screening circuit paralleling the first.

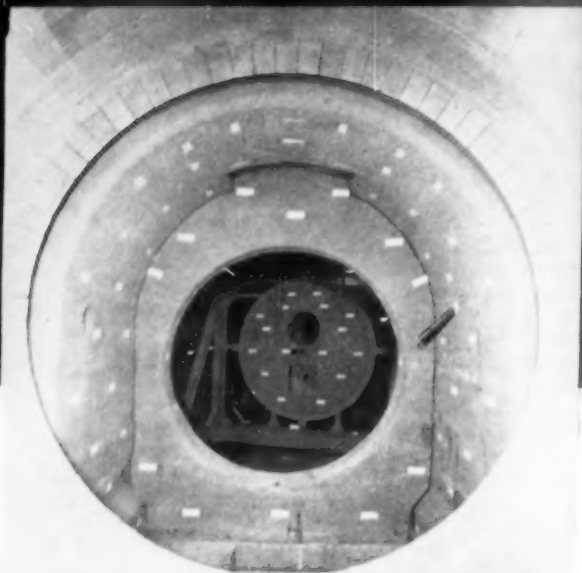
The covered storage area, which is open on both ends, is unusually large, measuring 120-ft. wide by 404-ft. long; the side walls are 47½-ft. high. The area is divided by concrete retaining walls to accommodate all bulk materials except clay. Total capacity is about 100,000 tons, with stone and clinker taking up 70 percent of the area. A series of mill feed bins are arranged along one wall; presently



Revolving 60-ft. car dumper discharging limestone into twin hopper

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JOB-ENGINEERED  
MONOLITHIC  
KILN  
FIRING HOOD



A. P. Green job-engineered monolithic refractory linings readily meet the complex construction requirements and varied service conditions in rotary kiln firing hoods. Furthermore, they offer specific advantages which can be money-savers.

The photograph illustrates A. P. Green SUPER HYBOND as recommended and installed in a typical firing hood. Notice the joint-free surfaces and positive anchorage throughout the lining. These features provide maximum protection against premature failure resulting from dust penetration, bulging, and buckling. Complicated, expensive masonry has been eliminated, as have resulting structural weaknesses.



### **SUPER HYBOND**

is a natural choice for such installations. It is a super duty plastic that develops high strength throughout the entire thickness of the lining—increasing the holding power of the anchors. Its high refractoriness readily withstands excessive temperatures, such as might occur in the seal ring or crown areas. Spalling and abrasion resistance are excellent.

A. P. Green offers a complete line of refractory products for the cement and lime industry. Whatever your requirement, for specific recommendations without obligation, contact your local A. P. Green Distributor . . . he's listed in the yellow pages of your telephone directory.

## A. P. GREEN FIRE BRICK COMPANY

Mexico, Missouri, U. S. A.

PLANTS: Mexico, Mo.—Woodbridge, N. J.—Sulphur Springs, Texas

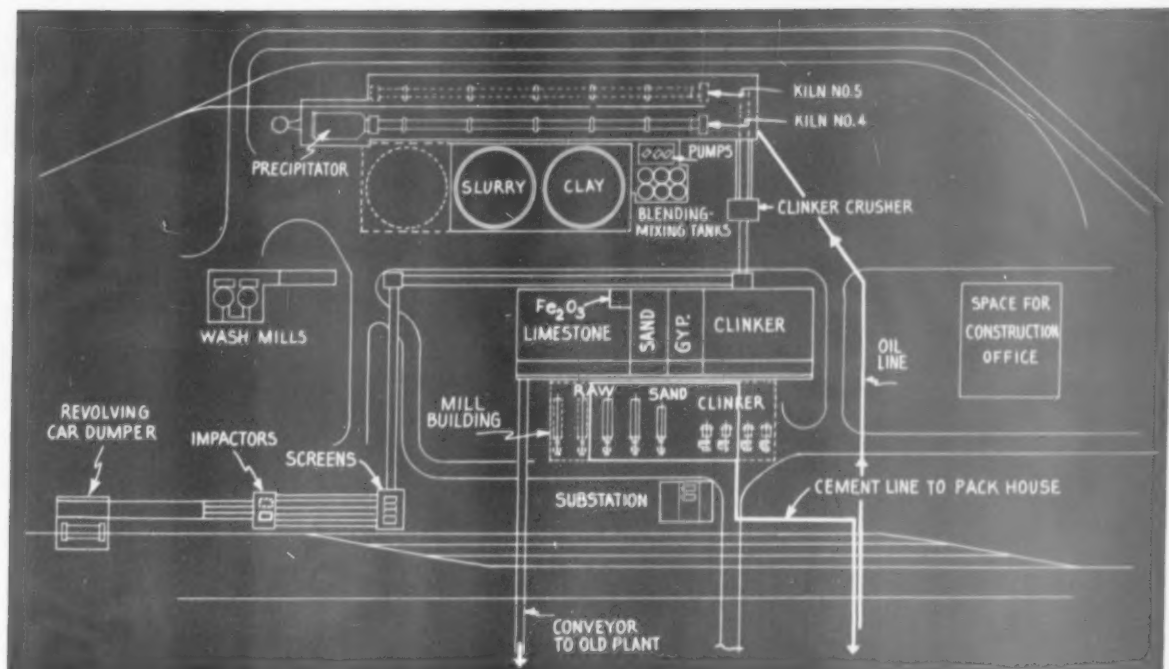
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*A. P. Green*  
**REFRACTORY  
PRODUCTS**







Layout of new cement plant at Fort Whyte, Man., located immediately north of old plant. Facilities being built during current expansion program are shown by dashed lines

four of these serve the raw mills, and three the finish mills. Additional bins are available to accommodate the new mills to be installed this year. The unusually wide span was dictated by economic reasons. Because the lacustrine clay at the site has a low bearing value, it was necessary to anchor the side walls on concrete caissons driven to bedrock—a depth of 60 ft. Due to the expense of this operation, it was considered cheaper to use a wider span with high side walls than to build a longer storage hall. The walls are supported by buttresses spaced

on 17½-ft. centers and varying in width from 24-in. at the base to 15-in. at the top.

Another interesting feature is the use of Ward-Leonard control on the 20-ton Provincial overhead bridge-type crane; it is one of the first installations in the cement industry. This direct-current type of drive was selected for smoothness of operation, higher speed of travel and bucket

\*In the old plant raw grinding is two stage, involving wet Kominuters and tube mills, with two additional tube mills being used for preliminary sand grinding.

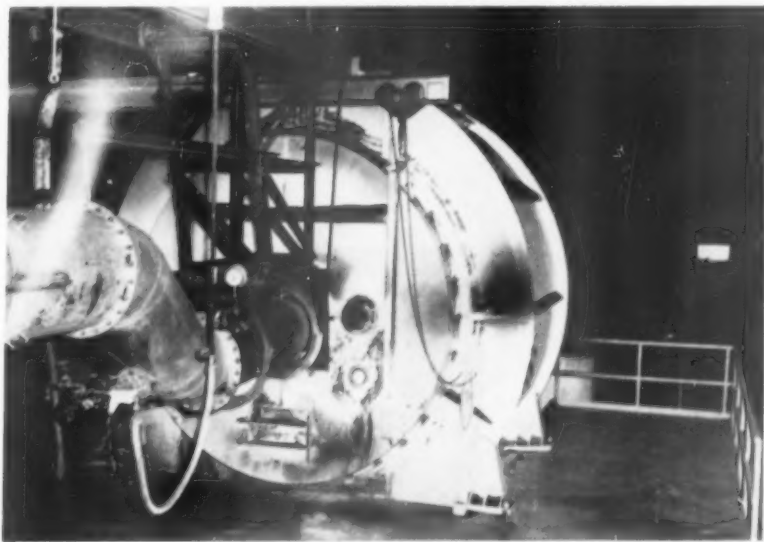
movement, with instantaneous reversing, and better spotting control. Further, due to smoothness of operation, maintenance costs are lowered, primarily by minimizing cable snapping. The crane carries a 5-cu. yd. Blaw Knox bucket, and is mounted on 175-lb. crane rail.

Raw grinding is done in open circuit with two No. 2414 Smidth 8- x 46-ft. three-compartment Unidan mills and one Smidth 6- x 36-ft. two-compartment Unidan mill. The latter is used for preliminary wet grinding of sand (to about 85 percent passing 200-mesh, with 39 percent water), the resulting slurry being fed to the larger Unidans by separate ferris-wheel feeders mounted on top the 18½- x 32-ft. 1000-bbl. sand slurry tank. Three- and 2-in. Wilfley pumps handle the slurry in and out of the tank, respectively. The sand mill is driven at 24.7 r.p.m. by a 400-hp. 720 r.p.m. motor through a Hamilton gear reducer, and is fed by rotary table feeder and belt conveyor.

Two-stage grinding of sand is necessary because of the highly abrasive characteristic of the local sand available. If the material was fed directly into the Unidans, their output would be reduced considerably, as was found from experience in the older Fort Whyte plant.\*

Stone is fed to the slurry mills by 3-ft. dia. Smidth rotary table feeders and short belt conveyors (the latter

*(Continued on page 104)*



Firing hood for 12- x 450-ft. kiln. Access to the burner floor is by way of a truck ramp

**For operations requiring short transmission steps and high over-all gear reduction...**

**THE NEW TDA<sup>®</sup>**

**WIDE**

## **A new member of the famous TDA 2-Speed Axle Family!**

The new TDA WIDE RANGE 2-Speed Axle brings a new concept of flexibility and driving simplicity to the automotive industry. It offers all the highly desirable advantages heretofore available only through the use of complex multiple-speed transmissions or auxiliary gear boxes without many of the penalties of one or the other:

WITHOUT laborious two-stick shifting.

WITHOUT wasteful excessive weight.

WITHOUT increased driver fatigue.

WITHOUT unusual wheelbase limitations.

WITHOUT higher initial vehicle cost.

WITHOUT higher maintenance cost.

WITHOUT excessive wear on the lower speed gears of the transmission.

WITHOUT restricted over-all gear reduction.

WITHOUT complicated shift patterns.

This is but a brief summary of the many distinct, positive, provable advantages afforded by the development of this new WIDE RANGE concept in the famous TDA line of double reduction two-speed axles. For complete information on the new TDA WIDE RANGE Axles now available (in both 2 to 1 and 2½ to 1 ratio spreads) call, wire or write your nearest vehicle dealer or branch.

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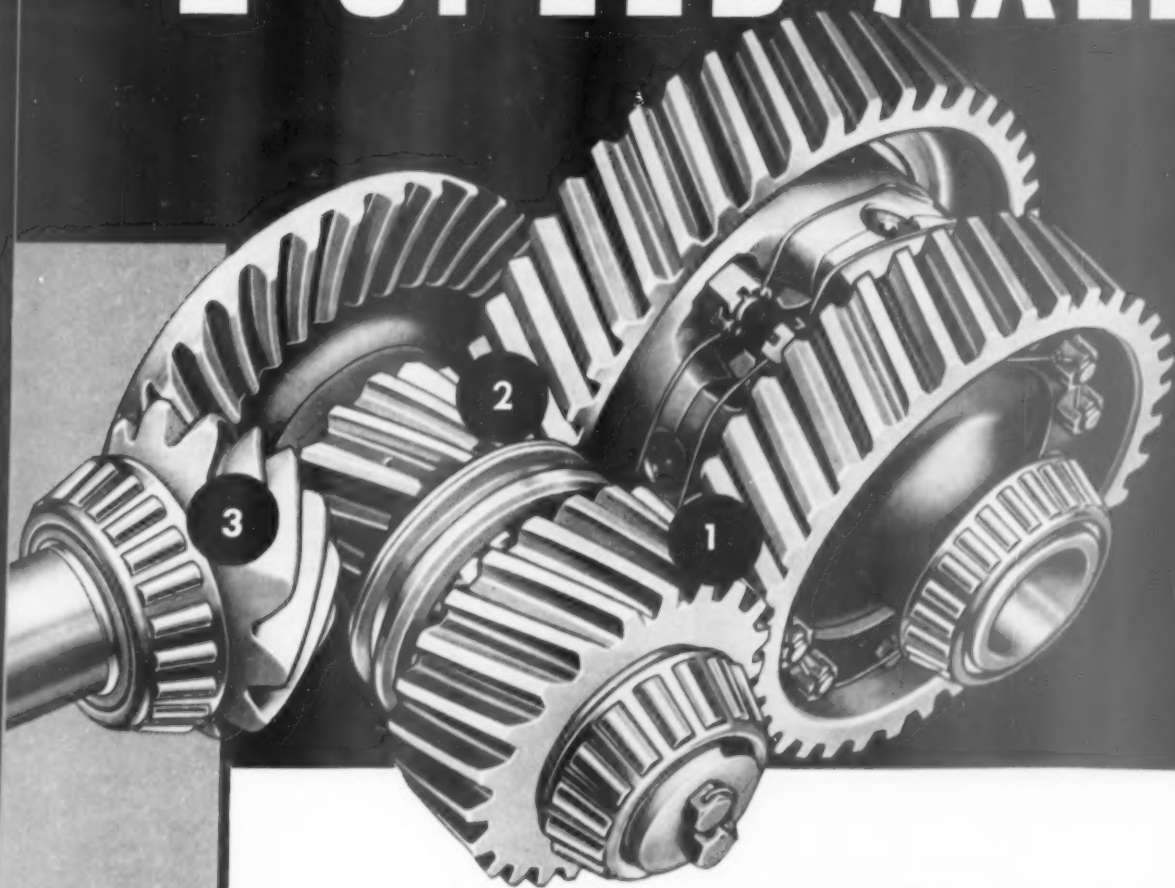
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# WIDE RANGE<sup>®</sup>

## 2-SPEED AXLE

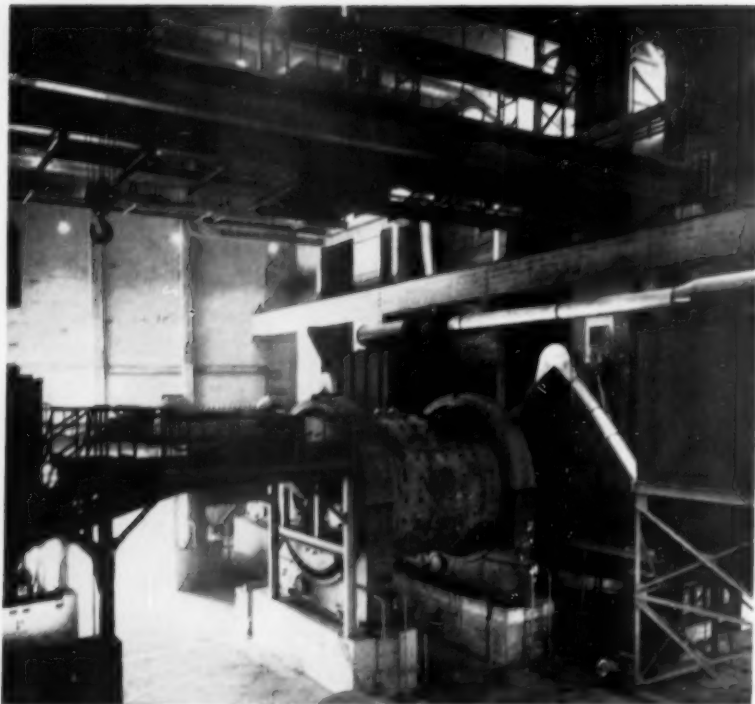


### *Here's the simple switch that turned the trick!*

The broader range of the new Timken-Detroit<sup>®</sup> WIDE RANGE 2-Speed Axle was achieved by a fairly simple mechanical rearrangement. We "flipped" our high-range (1) and low-range (2) helical gear

sets—reversed their relative positions—to place the enlarged helical pinion of the high-range gear set where it would not interfere with the hypoid pinion (3) of the first-reduction gear set.

**WORLD'S LARGEST MANUFACTURER OF AXLES FOR TRUCKS, BUSES AND TRAILERS**



Finish grinding section of mill building, showing two 11- x 15-ft. ball mills, each of which is vented to a bag-type collector

also handling the iron cinder), whereas individual ferris-wheel feeders deliver clay slip and sand slurry. Grinding is to 92 percent passing 200 mesh at a rate of 140 bbl. per hour; the water content of the slurry is 39 percent. The Unidans have slide-shoe bearings on the feed end and conventional trunnion bearings on the discharge end. They are driven at 20.5 r.p.m. by Westinghouse 1000-hp, 4160 v. 720 r.p.m. synchronous motors through Smidth TS-1150 Symetro

drives. The motors have leading power factors of 80 percent to compensate for the lagging power factor of the plant induction motors. Each Unidan mill is provided with E. M. reversible inching control. The slurry mills have forged steel liners in the first two compartments; and Nihard cast liners are used in the finishing compartments, as well as in both compartments of the sand mill. Initial ball charges consisted of 45,000 lb. of 2-, 2½-, and 3-in. balls in the first

compartment, 40,000 lb. of 1¼- and 1½-in. balls in the second, and 89,000 lb. of ¾- and 1-in. balls in the third. The sand mill carries 21,000 lb. and 51,000 lb. in the first and second compartments, respectively. Monroe quick-quench cast steel balls are used in both raw and finish grinding.

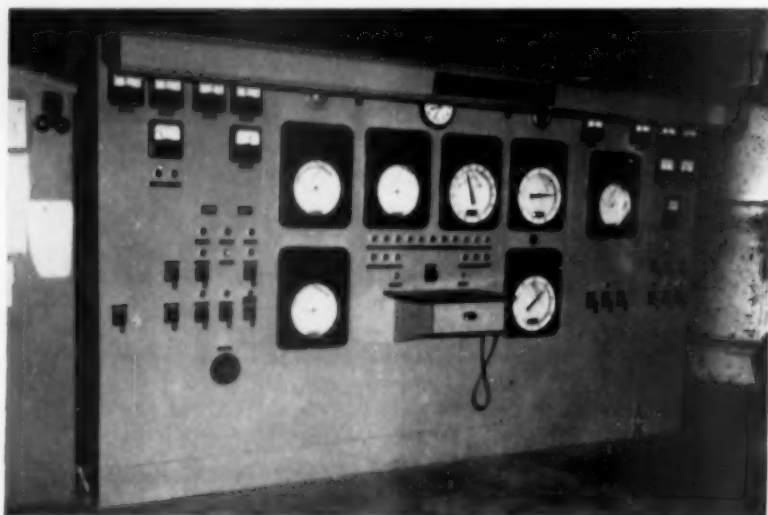
Two 10-ton Dominion overhead service cranes are provided in the mill building. One serving the mills has a cab control and a 50-ft. span. The second, located in the pressurized mill motor room, has a floor control and a span of 30-ft.

Slurry from each mill is discharged to a common sump and pumped by a 6-in. Wilfley pump (one standby) to a battery of six 20- x 42-ft. 1500-bbl. blending and mixing tanks. These have conical steel bottoms, through which air for continuous agitation is supplied through ¾-in. pipe. This method of delivering air was found to be much simpler, and requiring less maintenance than using long pipe from the top of the tank. Air is supplied at 50 p.s.i. by a 598 c.f.m. Chicago Pneumatic 15 x 11 single-stage double-acting air compressor.

**Four tanks are used for blending** (two containing a "high" carbonate mix and two a "low" mix); the other two tanks are used for mixing. The blending operation consists simply of draining proper amounts of "high" and "low" slurry to a common sump, from which the blend is pumped to one of the mixing tanks. After thorough mixing, the slurry is drained to same sump, and then transferred to the 110-ft. kiln feed slurry basin. Three 8-in. slurry pumps are used in this operation; one feeds the mixing tanks, one the slurry basin, and one is standby for either use. From the slurry basin, which has a capacity of 190,000 cu. ft. of slurry (sufficient for 3-days operation), the slurry is transferred by 6-in. pump (one standby) to the ferris-wheel kiln feeder. An interesting feature in the pump pit is the use of tight-fitting "snorkle" tubes, which are connected to the 100-hp. pump motors and project above the pit. In the event a pump gasket blows and the pit fills with slurry, the motors will continue to operate without being damaged.

**The new 12- x 450-ft. kiln** is oil fired, driven through Ward-Leonard control, and discharges clinker over a 6- x 50-ft. Narsted air-quenching cooler. It is exhausted by dual draft fans through an electrical precipitator; recovered dust is returned by a scoop feeder positioned 33 ft. below the chain section.

The kiln is of heavy-duty construc-

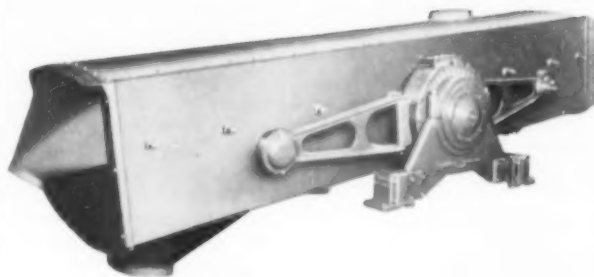


Kiln control panel, with instruments for controlling burning and related operations



# VIBRATING SCREENS

## FOR The CEMENT INDUSTRY

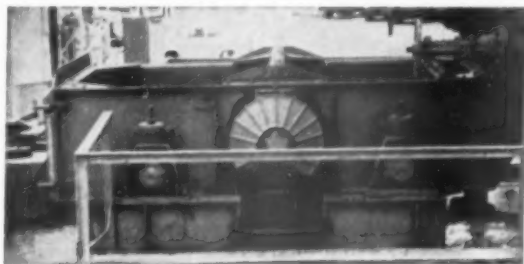


### SELECTRO SCREENS

For Scalping Cement ahead of valve bag packers and cement pumps to remove foreign matter. For efficient sizing operations. A four bearing positive eccentric screen. Adjustable both as to stroke and pitch.

### GYROSET SCREENS

For scalping and for raw material sizing. A rugged two bearing positive eccentric screen. Adjustable as to stroke from 0 to  $\frac{3}{8}$ " for efficient economical service.



For slurry scalping, or any type washing or de-watering operations. Simple construction yet flexible in action. Size ranges from 18" to 72" in width and 4' to 16' in length.

## PRODUCTIVE EQUIPMENT CORP.

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Mill motor room with 1000-hp. drive for No. 2 slurry mill in foreground. Room is pressurized and served by 10-ton overhead crane

tion, having a 1-in. shell throughout (except 2½-in. at the tires) and reinforced by two pairs of stiffener rings at each tire. It is supported on six cast steel full-floating tires (30-in. face), which ride on water-cooled oil-lubricated cast steel rollers of sleeve bearing design; the slope is ½ in. per foot. The thrust roller is positioned at the drive pier, and the kiln gear is attached to the shell by 12 spring plates. The kiln building has a ramp permitting trucks to drive onto the burner floor, and a track spur for thawing frozen cars.

The kiln is turned at 60 r.p.h. by a G.E. steel-mill-type 200-hp. 230/550 v., 515/1260 r.p.m. d.c. motor through a Dominion speed reducer. The motor is of rugged construction, and features a foldover cover on hinges which permits rapid replacement of the rotor; it is also electrically interlocked with an air cooling fan, so that the motor cannot be started without the fan running. The (10-hp.) kiln feeder d.c. drive and the kiln drive are synchronized and controlled by the Ward-Leonard system. The main advantage of this type of control is to provide infinite stepless speed range, allowing the drives to be varied in very small increments. Excitation for the two d.c. drive motors is provided by a 200-kw. d.c. shunt wound generator, which is driven by a 300 hp. 4160 v. induction motor. For emergency turning of the kiln, there is a Continental gasoline engine available, which drives the kiln through a Hamilton gear reducer.

Lining of the kiln, beginning at the firing end, is as follows: 12 ft. of 12-in. high duty; 20 ft. of 9-in. Magnecon; 36 ft. of 6-in. Magnecon; 40 ft. of 9-in. 70 percent alumina; 53 ft. of 9-in. high duty; 18 ft. of 6¼-in. in-

ulating brick; 39 ft. of 9-in. high duty; 83 ft. of 6-in. high duty; 21 ft. of 6-in. insulating brick; 51½ ft. of 6-in. high duty; and 76½ ft. of abrasive-resistant brick. The two sections of insulating brick were recently installed in the calcining zone on a test basis. There are no internal dams. The chain section, which is 65½ ft. long, is referred to as the Smidth Valby system, modified for this particular size kiln. A total of 810 14-ft. 9-in. chains (¾-in. size) are used; they are attached to form spirals.

Oil for firing is preheated with steam to 225 deg. F., and introduced into the kiln through a burner pipe at 225 p.s.i. Primary air is supplied by a Canada Blower fan of 25,000 c.f.m. capacity (at 22 in. static pressure and 250 deg. F.), which is driven by a 200-hp. motor. Drawn from the cooler through a damper control, the air is tempered with cold air to maintain a temperature (into the kiln) of 125 deg. F. Dust is removed ahead of the firing fan by a Precipitation Co. of Canada cyclone collector, the recovered dust being discharged to the clinker handling circuit.

The kiln is exhausted by two No. 060 F.L.S. induced draft fans which are rated at 130,000 c.f.m. capacity each (at 6 in. static pressure, 650 deg. F.). These are driven at 700 r.p.m. by 250-hp. 550 v. G.E. wound rotor motors; the outlet gas velocity is 3650 f.p.m. The gases first pass through a dust housing, followed by a 220,000 c.f.m. Cottrell KL precipitator. Kiln draft is regulated from the burner floor by means of a louver damper positioned ahead of the precipitator; the back end draft, taken in the dust housing, is maintained at about 4.5 in. w.g. Gases from the precipitator exhaust through a 200-ft. Custodis stack,

which consists of an outer concrete stack and an inner independent lining, separated by a 6-in. air space. The inside diameter of the inner stack varies from 15½ ft. to the 13 ft., and the O.D. of the concrete stack varies from 21 ⅓ ft. to 16 ⅓ ft.

The Cottrell precipitator consists of two three-unit sections. Each section in Units 1 and 2 has 25 duct-rod curtain assemblies (rods spaced on 8-in. centers), and the sections in the third or outlet unit have 20 duct-pocket electrode assemblies (pockets spaced on 10-in. centers). At the inlet end of the precipitator there are two dust hoppers attached to the structure. These, along with the precipitator hoppers, discharge to a 12-in. screw conveying system which returns the dust to the kiln via a Smidth scoop feeder. The system comprises four short paralleling conveyors mounted on the kiln floor beneath the precipitator, a long collecting conveyor, a bucket elevator, another long conveyor mounted along the kiln walkway, and the short conveyor into the scoop feeder. To prevent buildups in the precipitator dust hoppers, the company recently installed a Syntrol electric vibrator on each hopper. These are operated on an automatic timing cycle, with each vibrator running for ½ minute every 5 minutes. Prior to this installation, the dust would occasionally build up and short circuit the electrodes. Normally all of the collected dust is returned to the kiln by this method. An important factor contributing to the success of this method has been the maintaining of a uniform rate of feed to the kiln.

Clinker is cooled to 200 deg. F. over a 6- x 50-ft. Narsted air-quenching grate cooler. The grate in this cooler is stationary, and the material is moved by heavy cast steel drag bars which are operated hydraulically; a clinker breaker is attached at the discharge end. Cooling air is provided by an industrial fan of 132,000 c.f.m. capacity (rated at 7.9 in. static pressure and 100 deg. F.), which is driven by a 300-hp. motor. Preheated air from the forward compartment of the cooler enters the kiln as secondary air. Excess air from the remainder of the cooler is exhausted either directly to atmosphere through a steel stack, or by way of a 9VG Multiclone to a second stack, or both. The first stack acts as a pressure regulator, having a damper which can direct any or all of the exhaust gases to the Multiclone. A Canadian Blower No. 13 type SL fan serves the dust collector; it is driven by a 125-hp. 900 r.p.m. motor and has a capacity of 70,000 c.f.m.

(Continued on page 204)

# GENERAL REFRACTORIES



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*Whether it's a portland cement plant,  
a lime plant, a gypsum plant,  
or a kiln for burning dolomite  
and magnesite—we can supply  
all of your refractory  
requirements.*





**Tunnel portal** is of reinforced and gunite concrete. Concrete lining extends back into tunnel 80 ft. Note trolley wires for special haulage units

By **WALTER B. LENHART**

**A** FULLY MECHANIZED UNDERGROUND MINE featuring trolley truck haulage and 90-ft. high rooms (when completed) may be setting a new trend in mining practices. The entire industry is watching the development of Riverside Cement Co.'s Crestmore, Calif., mine, formerly the only limestone mine in the world using a block-caving technique.

A modified room and pillar system has replaced the block-cave system abandoned in 1954 because of rock changes, water conditions, rising labor costs, and little chance for mechanization. Begun a year ago, the mine is now supplying the requirements of Crestmore's portland cement plant which has a capacity of well over 300,000 bbl. of cement per month.

The mine's layout can be grasped by visualizing a modern multi-floor garage that has a ramp for access to the various levels. The haulage-way to the surface is comparable to the ramp. Rooms may be likened to the open space where cars are stored, and the pillars are analogous to supporting columns. In the case of Crestmore mine, the rooms will be 90 ft. high and the floor 40 ft. thick.

The portland cement plant and mine are located only a few miles from Riverside, Calif. Cement manufacture started in 1909, when limestone was supplied by surface mining. In 1927 the company went underground to get its stone through the use of a block-caving system of mining. It is the only limestone mine in the world to have used this system. Block-caving was

## Something New In MINING

### TRACKLESS TROLLEY TRUCKS

... used in new Crestmore, Calif., mining operation of Riverside Cement Co. Modified room-and-pillar excavation with latest drilling and loading equipment replaces old block-cave system

abandoned in 1954 for several reasons: 1. Little possibility of increasing mechanization; 2. Rising labor costs; 3. Changes in the physical characteristics of the rock; 4. Water conditions. From 1941 to the time the mine was closed, some limestone was secured from open-pit work as well as from the underground mine. After closing the old mine and during development of the new one, stone for the plant was gotten from small, scattered deposits in the area.

**The present underground mine** at Crestmore is in the same bed of limestone formerly mined by block-caving, which left a large open pit several hundred feet deep, 1500 to 2500 ft. long and several hundred feet wide. An inclined roadway has been driven

down a side of the pit (ROCK PRODUCTS, September, 1955, p. 76) to the toe where a portal for the new tunnel was opened.

The haulage tunnel is 30 ft. wide and 25 ft. high and follows the foot-wall of the limestone bed. It is zig-zagged to maintain a 10 percent grade from bottom to the mill area.

The Crestmore deposit consists of two high-calcium limestone beds that outcrop at the surface. The two beds are separated by some 500 ft. of granodiorite. The beds strike north and south and dip to the east at about 45 deg. At depth the dip flattens out to 25 to 30 deg. To the east the two beds converge until they are separated only about 100 ft. by the granodiorite. The upper bed is covered with a water-

(Continued on page 112)

**Haulage unit** being loaded by a 1 1/4-cu. yd. shovel. This equipment is used in driving the headings. The haulage unit has a capacity of 18 tons







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in Mines and Quarries**



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fit any operation . . .  
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# **Euclid Equipment**

FOR MOVING EARTH, ROCK, COAL AND ORE



# LIMESTONE PLANT PRODUCES

## *Belt Conveyors Carry Enough Stone to Fill a Car*

This is the production schedule at the crushing plant, one of the largest producers of cement products in Southern California. One thousand tons per hour of limestone are crushed, processed and delivered to storage for loading into 85-ton dump hopper cars at the rate of one every three minutes. Engineers from the customer and from Hewitt-Robins worked closely in the development of this system, which utilizes Hewitt-Robins conveyors and vibrating equipment.

The 6" x 0" product of a primary crusher near the quarry face is elevated by inclined conveyor at 2000 TPH to an initial surge pile to supply a backlog for the secondary impactors. To further ensure continuity of operation, identical, independent belt conveyor systems operate side by side at 500 TPH each from the surge pile to duplicate screening and secondary crushing stations.

Here "overs" from the primary screens drop into impactors and are recirculated by conveyor to secondary screens. Secondary screen "overs" are fed back through the impactors. The 3/4" "thrus" from all the screens are united by conveyors on a common 1100-foot, 1000-TPH conveyor terminating in a cantilevered boom for charging an 8000-ton storage pile. This storage pile is ample to bridge any gap which may arise between main plant requirements and quarry production.

Throughout the aggregates industry, Hewitt-Robins equipment and engineering know-how are thus helping to develop more economical production through increased mechanization.



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"GLIDE RIDE" THE NEW MOVING SIDEWALK



# HEWITT

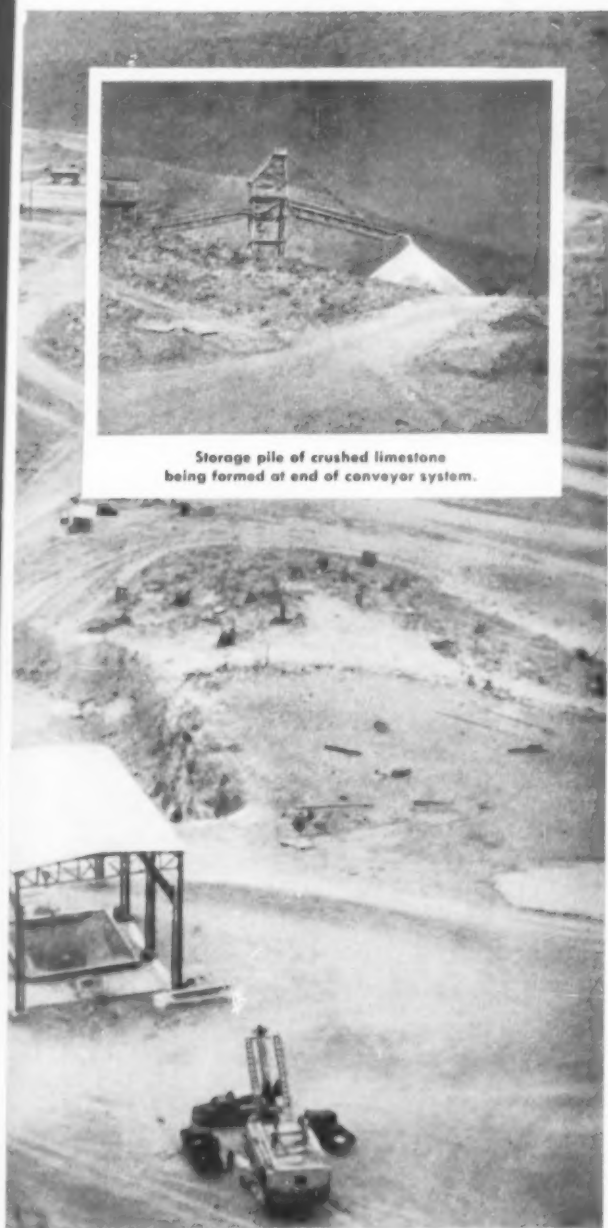
STAMFORD,

# 1000 TPH

*in 3 Minutes*



Storage pile of crushed limestone  
being formed at end of conveyor system.



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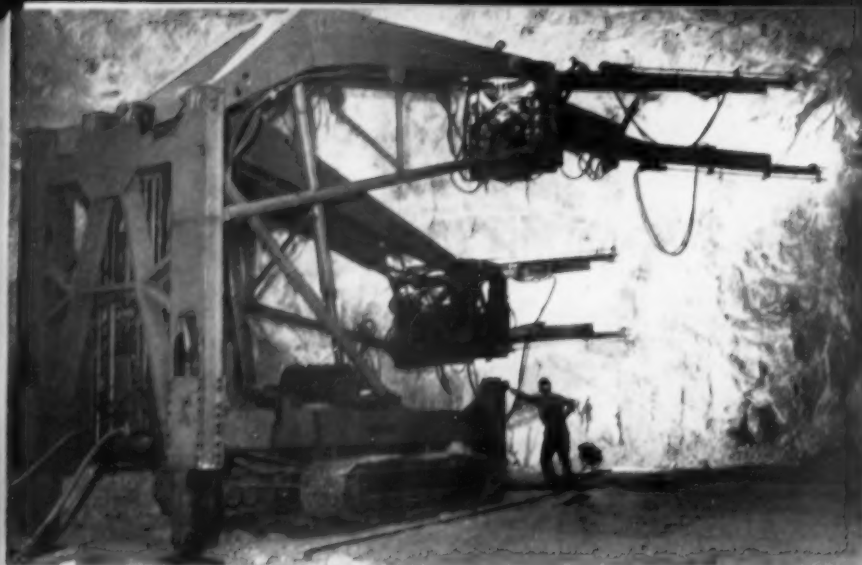
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**Jumbo drill**, mounting four machines, does all drilling except for the tunnel work

saturated alluvium. As a result, it is not presently planned to mine the upper bed.

The metamorphosed, crystalline limestone in both beds is hard, durable, and non-air-slaking. The beds are 200 to 300 ft. thick and about 2500 ft. long on the strike, cut off at the ends by granodiorite. The bed being mined is surrounded entirely by the non-porous granite rocks that tend to seal off most of the water. The mine is kept practically bone-dry by the use of a submerged 700 g.p.m. deep-well pump that keeps the water table well below the working levels.

In 1949 it was decided to core drill the limestone beds at Crestmore. Three diamond drills were purchased and an extensive drilling program was pursued until the latter part of 1953. A Tro-Pari drill-hole surveying instrument was used on all drill holes. All cores were photographed, some in color. The photographs were enlarged to a scale of two inches per foot to give important information as to fracture planes and other planes of weakness. Cores were split and a complete chemical analysis made. The drill holes also gave important information on water conditions that might be encountered.

The use of scale models played an important part in laying out the new mine. One model was designed to show the general geology of the deposit, water tables and surface contours. The other is of solid plastic material, portions of which can be removed to clearly show the proposed workings.

Early in the planning stage, members of the mining staff of Riverside Cement Co. visited several underground limestone mines. They included in their tour the United States Bureau of Mines experimental mine at Rifle, Colo. The oil shale being mined at Rifle (ROCK PRODUCTS,

March, 1952, p. 80) is about as hard and tough as most limestones. Based on mine inspection trips, the company's experience with block-caving, diamond drill data, tests on rock strengths, study of the mine models and other data, it was decided that a fully mechanized underground mine using large openings was the answer to the mining problem. Diamond drilling proved there was in excess of 100 years reserve of rock available in this deposit. Preliminary work was started on the project about a year ago. The inclined haulage-way is now about 400 ft. deep, and will be deepened as it becomes necessary to open additional levels. The mine is now supplying the requirements of the portland cement plant at Crestmore, which has capacity well over 300,000 bbl. per month.

The tunnel has a portal of reinforced concrete and gunnite construc-

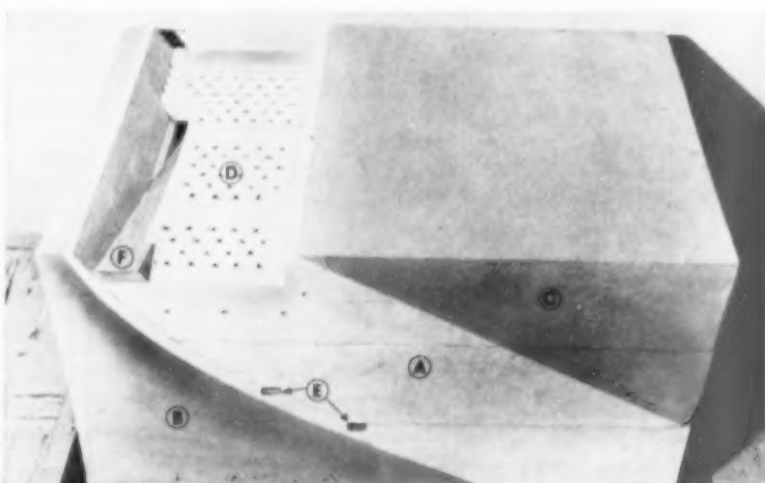
tion, the concrete work extending back some 80 ft. Roof bolting is practiced as needed, but with no set pattern. A two-drill, air-operated and self-propelled Roger's jumbo is used for tunnel work. The standard tunnel round is a 60-hole V-cut drilled to a 12-ft. depth.

Holes are loaded with 500 lb. of dynamite, which is fired with electric delays. The eleven-man crew averages one shot per day producing about 800 tons of stone. Rate of tunnel advance is 12 ft. per day. A 1¼-cu. yd. Marion electric shovel loads into three 18-ton capacity Turnarockers. These haulage units were chosen because of their short turning radius, less than 21 ft. The shovel has been modified with a short boom and dipper stick to facilitate its work in the confined tunnel space. The Turnarockers are provided with exhaust gas scrubbers.

Adequate ventilation is provided by three Joy axial-flow fans that deliver about 50,000 c.f.m. Some natural circulation of air has been produced by connecting the new workings with the old shaft. The shaft also provides a second outlet to the mine, a "must" under California mining laws.

A level is opened from the haulage-way with a horizontal entry 60 ft. wide and 30 ft. high driven across the deposit from footwall to hanging wall. Crosscuts are driven from this entry. Added openings are made parallel to the entry so that 60- x 60-ft. pillars remain. A block 40 ft. thick is left between levels to provide additional support. After a room has been opened, it is planned to take two bench cuts, each 30 ft. thick. When benching is started, the company plans to use vertical percussion drills. A completely

(Continued on page 114)



**Mine model** with the light-colored section (A) indicating the limestone bed; (B) the footwall; and (C) the hanging wall. (D) indicates the draw-holes that were part of the old block caving system of mining and is essentially the surface but are in the bottom areas of the quarry-like opening that remains. Spots marked (E) are the location of the spiraling entry-way as it follows the footwall down; (F) is the entry-way

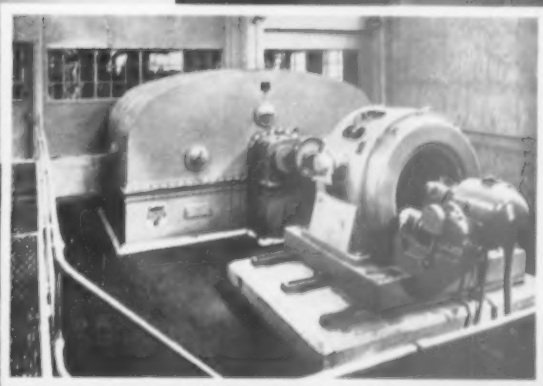


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Over 7500 HP transmitted through Symetro gears direct to trunnions of raw mills in cement plant illustrated above.



Driving station for large clinker mill showing motor and Symetro gear in separate enclosure.

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**Loading** one of the electric-power driven trucks in the mine, using a 3-cu. yd. shovel. Note how trolley poles are retracted when power to the truck is delivered by the cable



Unloading 35 tons of limestone to the primary crusher. Truck is driven by a 350 hp., direct-current motor

**Jumbo type drill**, to the left, and **extendable platform** used for scaling and drilling



## NEW MINING METHODS

(Continued from page 112)

mined-out room will be 60 ft. wide and 90 ft. high.

The use of electric trucks for rock haulage is an innovation that deserves special mention. There are four of these units in use. They haul all rock from mining operations, units of other types handling rock secured from development work. The electric trucks are Kenworth units with a struck capacity of 30 tons each. Actually, each handles close to 35 tons per load. The General Electric 550 volt, d.c. motor of each truck is rated at 350 hp. It is located about where the transmission would be in a conventional truck. The trucks haul to the primary crusher, a distance of 0.6 miles at 12 m.p.h. It is expected that cost of power requirements for trucks will be low, and maintenance should be about one-half of that for other types of haulage systems.

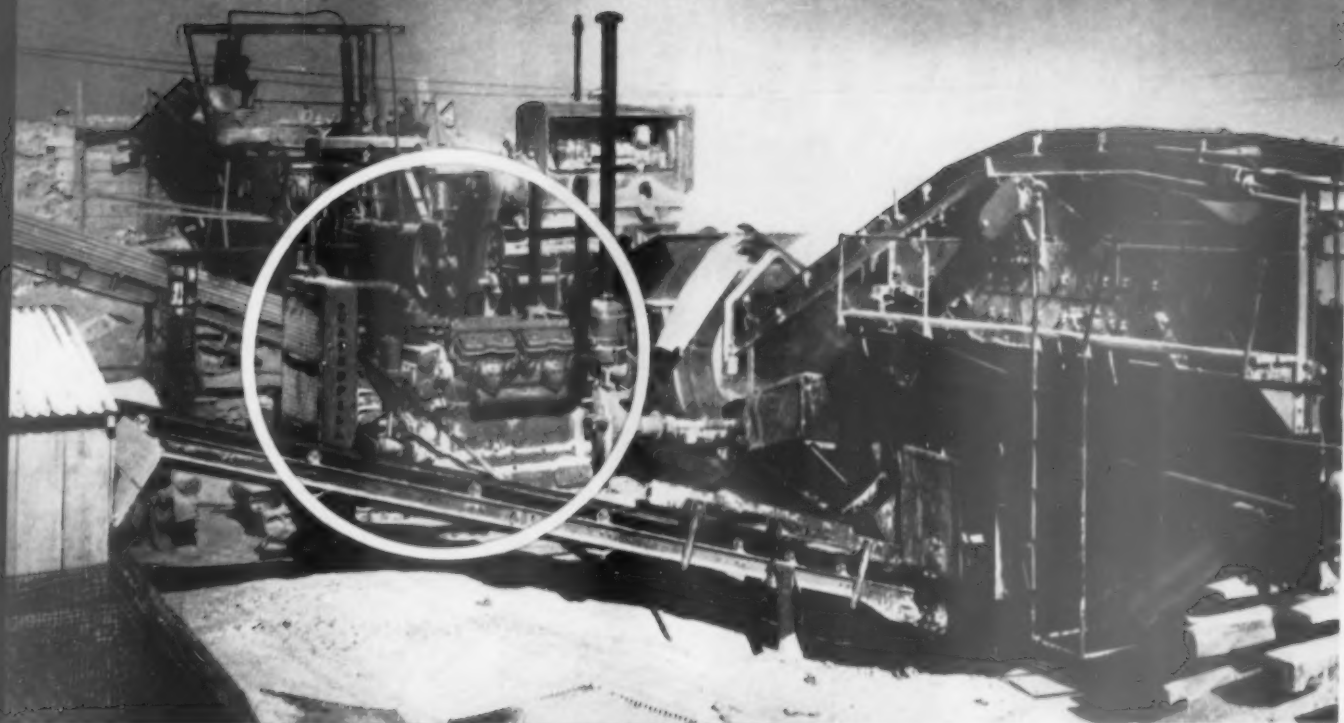
An electric truck operates smoothly and quietly with no noxious vapors. The rear-dump trucks at Crestmore take power from two trolley cables that are fastened to the back of the haulage tunnel and headings, and extend to within 200 ft. of the working face. From that point a cable reel is used. Power is supplied from two points, one in the mine and one near the mill.

The trolley poles on the trucks are retracted or extended by air. When the reels are used, the poles are hooked down in a protected position under the cab canopy. Driver protection has been emphasized throughout the Kenworth design; a limit switch prevents moving the truck when it is in the dumping position. Pressure switches prevent power being taken from the trolley wires when the poles are in the retracted position. A 10-hp. 550-volt auxiliary motor supplies power for the air compressor, lighting system, power steering, and hoist pump.

An hydraulic boom and platform is another interesting piece of equipment used at the property. The boom of the Pitman "Giraffe" has a height of 65 ft. when in the extended position. The unit is used for barring-down (scaling), roof bolting, and for loading high holes. It is mounted on a remodeled quarry truck from which the cab was cut away to allow maximum visibility. The hydraulic motor receives its power from the truck engine. All operations can be controlled from the upper working platform, or from the cab. Outriggers are provided to give the unit maximum stability.

(Continued on page 117)

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This CAT® V-8 Diesel has cost only \$2133 for repairs in 21,000 hours, including an overhaul after 20,000 hours. "Cat products, in our estimation, are the work horses in their field. They're easy to service and down time is less. We figure we've lost about four hours on our three Cat Engines in three years." Mr. E. B. Moubry, manager of the Aggregate Division of Standard Industries, Inc., and Lee Courtney, his superintendent, agree that this is the best performance one can expect. Standard Industries, Inc., of Tulsa, is a wholly-owned subsidiary of Tecon, Inc., Dallas, Texas.

This Cat, together with two smaller Caterpillar Engines, powers a Cedarapids portable crusher with an output of more than 1000 tons per nine-hour day of limestone and base materials. Thus repair costs have been only 10¢ per 120 tons produced. The two D13000s are veterans of 18,000 and 10,000 hours on the job.

This long and trouble-free work life is a Caterpillar tradition. The compact V-8 Cat retains new-engine efficiency over many thousands of hours, thanks to such Caterpillar features as foul-free fuel injection

system, aluminum bearings and "Hi-Electro" hardened cylinder liners and crankshafts.

Efficient filtration is especially important in an engine that must work in dusty conditions in a pit or quarry. Years of research and development have gone into Caterpillar fuel and lubricating oil filters that keep out engine-wearing abrasive particles.

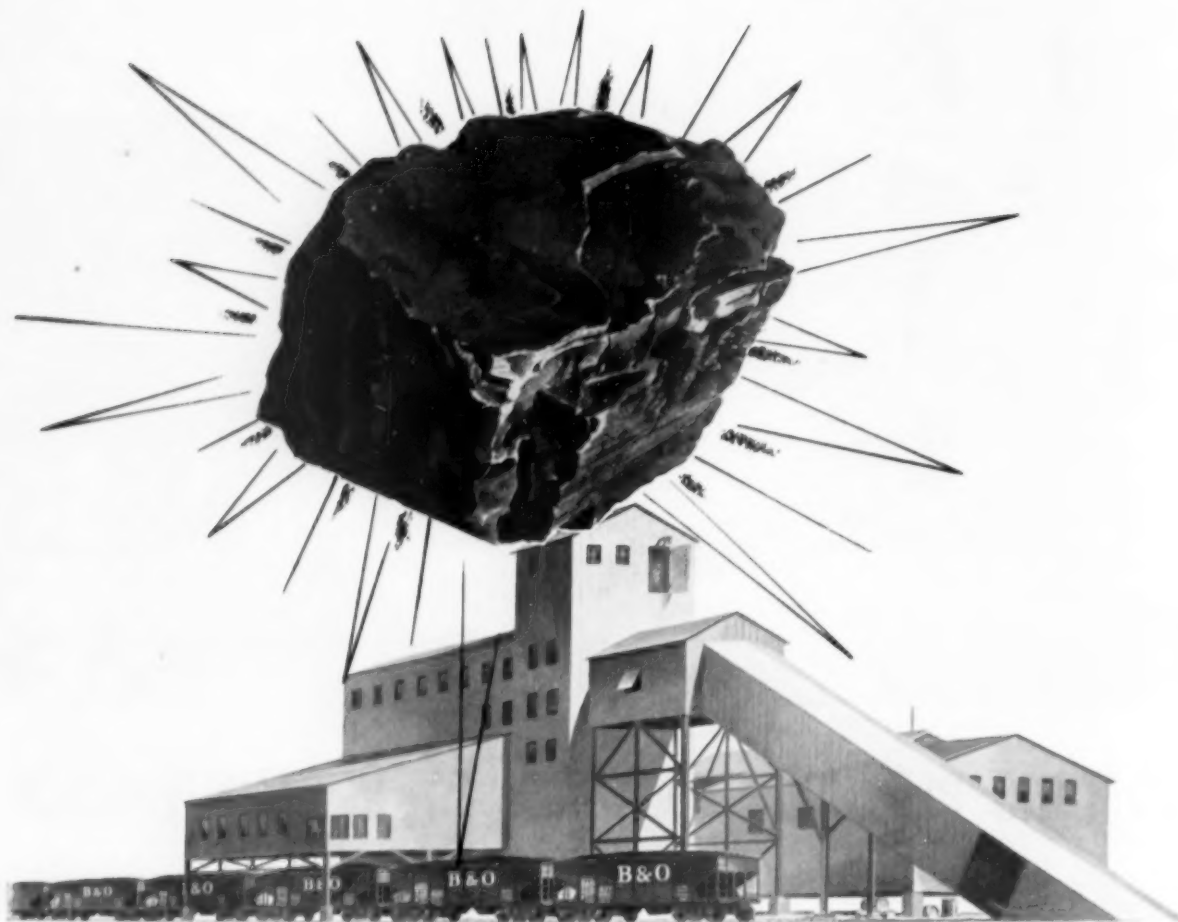
Leading manufacturers can supply Caterpillar Engines in their crushing and excavating equipment. And your Caterpillar Dealer can supply you with the rugged yellow diesel of your choice when it's time to repower. See him today for information on the full line of Caterpillar Diesel Engines up to 650 HP (maximum output capacity). He'll help you select the Caterpillar Engine that's built to do the most work over the longest period of time on *your* job.

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## NEW MINING METHODS

(Continued from page 114)

A 4-machine Ingersoll-Rand crawler-mounted jumbo is used for mining work (room cross-cutting and rock extraction). It is custom built, and is one of the heaviest pieces of equipment of its kind in use. A standard Marion 93-M shovel with short boom and dipper stick and 3-cu. yd. bucket is used for production work, and a Michigan 2½-cu. yd. front-end loader keeps the roadways clear. It also is used for general clean-up work.

Visitors are taken into the mine on an old truck that has been provided with seats for 20 to 25 people, and it is expected that the mine will be visited by a large number of the metal mining fraternity during the October Mining Congress meeting at Los Angeles. Locally, the mine already has experienced a modernistic touch—city officials want to use the rooms as air-raid shelters.

The mine now operates around the clock six days per week. Later, when development work reaches an optimum point, it is expected that two shifts will suffice. Still later, when underground quarrying is well underway, one shift may be adequate. A modern "dry" or change room is provided.

The primary crusher at the Crestmore is a 60- x 84-in. Traylor jaw and will handle 5-ft. dia. rock reducing it to 8-in. A Williams hammermill is the secondary crusher that reduces stone to minus 2-in.

Garner A. Beckett is president of Riverside Cement Co. Howard R. Starke is vice-president and technical director, and R. H. Wightmann, superintendent of mining, had much to do with planning and development of the Crestmore mine. The mining department is operated as a separate company unit. Consultants on mine development were E. D. Gardner, formerly chief engineer, U. S. Bureau of Mines, and E. Sepprelle, general superintendent of mines, Mississippi Limestone Co., and formerly in charge of oil shale mining for U.S.B.M. Prof. Philip Buckley of Columbia University made rock strength tests.

Peter B. Nalle is mine superintendent. At Crestmore are Frank Brown, mine supervisor; C. C. Chandler, chief mining engineer, and B. G. Preston, head mine foreman.

### Choose New Mexico Site

DEWEY PORTLAND CEMENT CO., Kansas City, Mo., will build a \$10 million plant at Placitas, N. M., about 17 miles north of Albuquerque. Capacity of the new plant will be 1,250,000 bbl. of cement annually.

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Not conversation, but **FACTS:** the KIESLER clam shell, using the *proven* principles of leverage and power—applied to both shells—has more "DIGGING-IN" ability than any other bucket made. Results are deeper penetration-on-every-trip regardless of the material being moved, and greater payloads.



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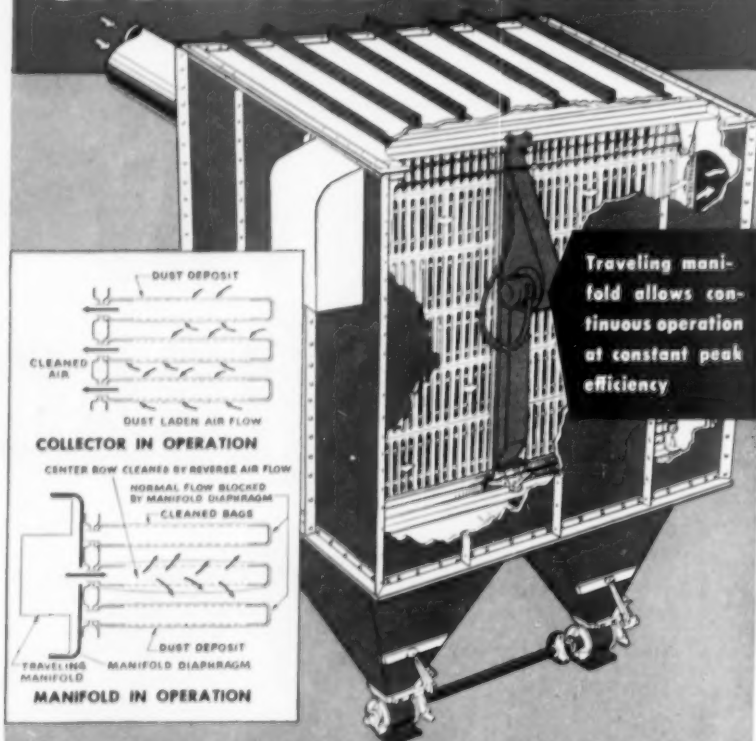
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A manifold with integral blower slowly traverses the clean air outlets of the screen frames. Covering three rows of screens at any given time, it applies a reverse air current through the center row to remove collected dust from the cloth surfaces. The result is constant high collecting efficiency and continuous operation—shutdown of the system for periodic cleaning is eliminated. Because of design simplicity and unit construction, this unique collector requires lower initial, operating and maintenance costs as well as less floor space than comparable collectors.

For full details, write for Bulletin 915 to PANGBORN CORP., 4300 Pangborn Blvd., Hagerstown, Md.

## Pangborn

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## CONTROLS DUST

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### Zonolite Elects President

JOHN B. MYERS has been elected president of the Zonolite Co., Chicago, Ill. He was formerly vice-president in charge of mining and production at Libby, Mont., and succeeds A. T. Kearney, who continues as chairman of the board. Mr. Kearney, a pioneer in vermiculite, has been president since 1939, and has been serving in both capacities since 1954. Mr. Myers joined Zonolite in 1934, was elected vice-president in 1944 and a director in 1946. J. A. Kelley, vice president of the southern division, has been appointed executive vice-president of mining and production. R. W. Sterrett, vice-president of the concrete products division, has been named vice-president and general sales manager, and D. L. Prouty, formerly a divisional vice-president, has been made vice-president in charge of market research. D. J. Boone, vice-president, is in charge of merchandising, advertising and sales promotion.

### Wisconsin Association Officers

J. D. SULLIVAN, Wausau Sand and Gravel Co., Wausau, Wis., was recently elected president of the Ready Mixed Concrete Association of Wisconsin. He succeeds Donald G. Schuster, Schuster Quality Concrete Co., Green Bay. Other officers named are John R. Findorff, Findorff Lumber & Supply Co., Madison, vice-president; and Harold C. Mulvey, Twin City Transit Mix Concrete Co., Inc., Neenah, secretary-treasurer.

### Ideal Names Vice-President

HARRY B. BOLTON has been appointed vice-president for administration, Ideal Cement Co., Denver, Colo., in addition to his duties as general sales manager. In his new capacity, Mr. Bolton will handle sales, advertising, promotion, publicity, traffic and research and development program for the company. T. W. Rosebaugh, formerly Pacific Region vice-president, has been named a vice-president of the firm.

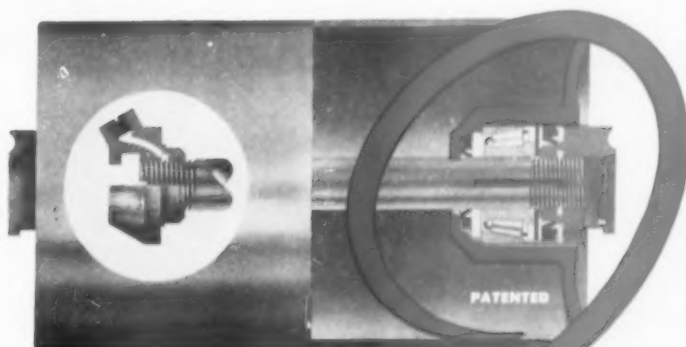
### Association President




EDWARD J. NUNAN, Buffalo Slag Co., Buffalo, N.Y., has been elected president of the Empire State Sand, Gravel and Ready Mix Association, New York, N.Y. John B. Hopkins, Albany Gravel Co., Inc., Albany, was named vice-president; Harold Keahon Bros., Inc., Pearl River, secretary; and R. M. Burgess, Mohawk Valley Concrete Co., Inc., Canajoharie, treasurer. Paul R. Smith is executive secretary of the Association.

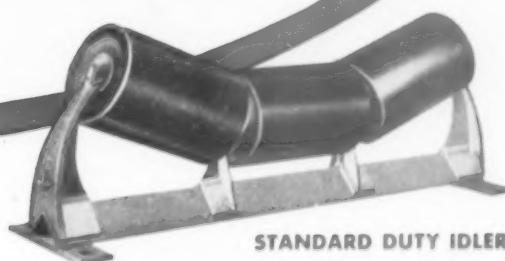
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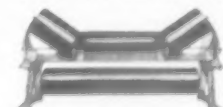
Most important—this construction permits operating the Continental "UST" Idler without relubrication for 1-2-3 years depending upon the severity or character of conditions.



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Mounted between raw mill building and old kiln building may be seen the new 10- x 340-ft. kiln. Note that it is enclosed to the drive pier. Walkways are of precast concrete

# Lone Star

## Boosts Bonner Springs Capacity 60%

### THREE TYPES OF FUEL

... may be used to fire new 10- x 340-ft. wet process kiln at Bonner Springs, Kans., plant. Enlarge other departments, and closely integrate old with new units

By KENNETH A. GUTSCHICK

ONE OF THE FIRST PROJECTS TO BE COMPLETED under the current \$57 million expansion program\* of Lone Star Cement Corp. involved the Bonner Springs, Kans., wet-process plant. Located 15 miles west of Kansas City, Mo., the plant was expanded to enable Lone Star to keep pace with booming construction activity in eastern Kansas, as well as to service the Topeka-Kansas City section of the Kansas Turnpike project. Capacity at Bonner

Springs was boosted by 60 percent, to 2,400,000 bbl. annually.

The program involved the installation of a fourth kiln and the enlargement of all other production departments with the exception of cement storage and packing. Construction, under the direction of MacDonald Engineering Co., commenced in February, 1955, and the new facilities were started up nine months later. The project was completed without any production loss or lost-time accidents during construction.

The Bonner Springs plant, one of the older ones in the industry, was purchased by Lone Star in 1923 and completely rebuilt the same year. In

the intervening period, improvements were made in accordance with manufacturing trends, but none of these increased capacity substantially. The plant, prior to 1955, consisted of three 1400 bbl.-per-day 219-ft. rotary kilns, each with a rotary cooler. Raw grinding was three stage, and involved the use of three preliminary Kominuters (each closed-circuited to a vibrating screen), three secondary tube mills, and one larger tube mill used for final grinding. Second and third stage grinding operations were in open circuit. Finish grinding was two stage, and was accomplished by eight preliminary Griffin mills followed by three tube

(Continued on page 122)

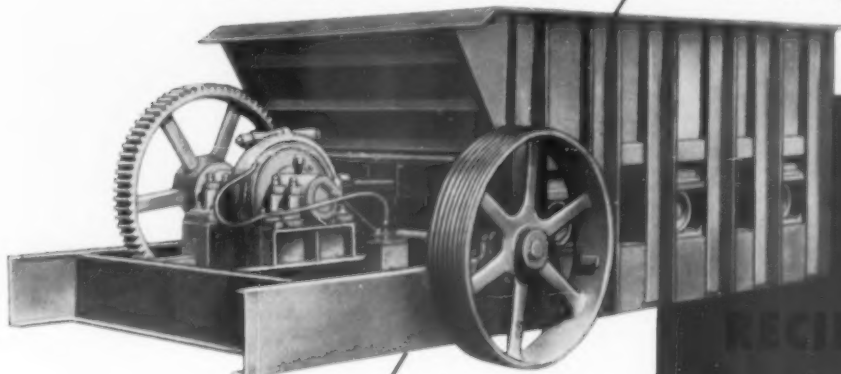
\*Upon completion of this program, Lone Star will attain a domestic annual capacity of 33.8 million barrels, which is more than double its domestic capacity at the end of World War II. This growth has been accomplished by expansion of nearly all plants in the system, coupled with building of three new plants, one of which is now under construction at Lake Charles, La.



# A Great Combination..

## For Low Cost Handling and Crushing Operations!

A combination of McLanahan Reciprocating Plate Feeder and Rockmaster Crusher is your answer to most economical feeding and crushing of 1000 tons or more of limestone, ore or rock per hour. Equipment can be furnished as component parts or as separate units to best suit your application.



1

**Heavy Duty**

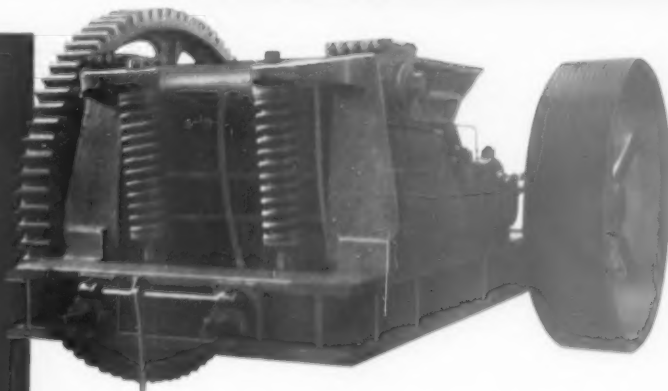
**RECIPROCATING  
PLATE FEEDER**

Built to handle materials from the size of sand to shovel-loaded rock, McLanahan Adjustable Reciprocating Plate Feeders automatically control the rate of flow of material, and are quickly adapted to the producing capacity of any machine.

2

**Single Roll**

**ROCKMASTER  
CRUSHER**



The McLanahan Rockmaster Crusher is the economical solution to most any crushing problems. Greatest savings can be achieved by this combination of equipment. Outstanding for primary and secondary crushing operations, for use on limestone, gypsum, rock, gravel, shale, iron ore, slag and other materials.



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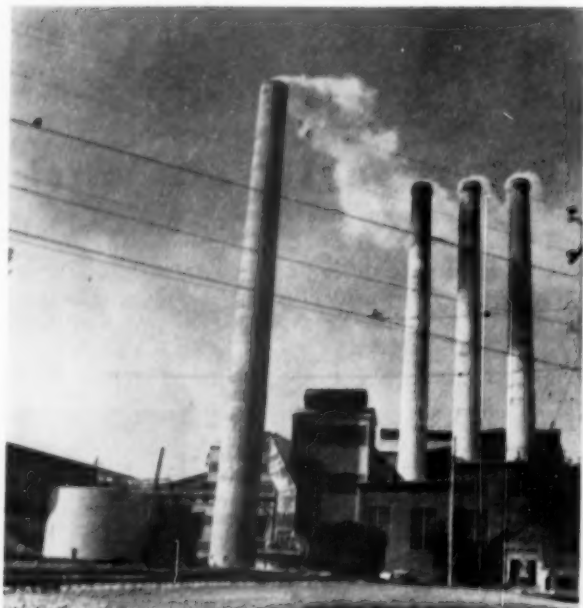
For Bulletins  
RM-505 and FRE-4812

**McLANAHAN & STONE CORPORATION**

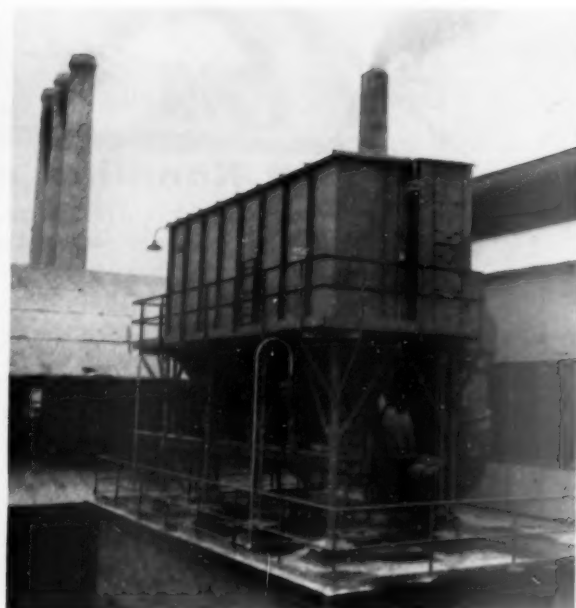
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Hollidaysburg, Pennsylvania

**Dependable Products:** Single and Double Roll—and Jaw Crushers, Crushing Plants, Reciprocating Plate and Apron Feeders, Roll Grizzlies, Conveyors, Elevators, Screens, Scrubbers, Steel Log Washers, Sand Drags, Hoists, Jigs, Dry Pans, Dryers, Scrap Bundlers, Pulleys, Gears, Bearings, Sprockets, Sheaves, Rollers, Bin Gates, Elevator Buckets, Gratings, Car Wheels, Ferrous and Bronze Castings.

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**View of plant** showing 200-ft. stack for new kiln on the left; smaller stacks for three older kilns. Two new kiln feed slurry tanks are shown to the left



**Dust collector** serving crusher building; recovered dust is fed to the covered storage area to the left

mills, the latter operated in closed circuit with air separators.

In the present operation, the new and old facilities are closely integrated. Expansion in most cases was accomplished by simply extending each department. In the case of the new kiln, however, there was a difficult erection problem, since the kiln had to be placed in a 20-25-ft. space between the kiln building and the building housing the raw mills, warehouse, and shop.

**The new kiln** is a 10- x 340-ft. 2500 bbl.-per-day Traylor unit which is fired with coal (using a Raymond unit bowl mill) or gas or oil. Gas is preferred but is available only on an interrupted basis. Burning and related

operations are controlled through elaborate instrumentation. Cooling is effected by a 4½- x 70-ft. Allis-Chalmers air-quenching grate cooler, which, along with the three rotary coolers, discharges to a common shaker conveyor.

In order to balance the 2500-bbl. capacity increase, the company enlarged nearly all other departments. Two high-capacity hammermills were installed in the crusher building for secondary reduction, and the storage area (used only for limestone and shale), was extended on both ends, increasing its capacity by 75 percent. A reversible shuttle belt conveyor also was installed to serve the entire length of the storage building.

A 75 t.p.h. 10- x 12-ft. 2-in. Tray-

lor ball mill was added to the raw grinding circuit, to supplement the Kominuters in preliminary grinding. This mill is closed-circuited with two new vibrating screens. Two 3000-bbl. slurry tanks also were added to serve as feed tanks for the four kilns.

On the finish end, a 125 bbl.-per-hour 10- x 16-ft. 2 in. Traylor ball mill was added, which is operated independently from the older two-stage grinding circuit. Like the finish tube mills, however, it is closed-circuited to a 16-ft. Sturtevant air separator. Addition of this mill has stepped up clinker grinding capacity from 5500 to 8500 bbl. per day.

**A unique feature** in the new finish grinding circuit is a watercooled



**A 3-cu. yd. shovel** loading floor rock into 20-ton truck



**Side-dump trailer** discharging 12-ton load into primary crusher feeder hopper. End-dump trucks unload to the right

**From the size of a Piano to 3" in ONE PASS!**

**with this Big 53" x 60"**  
**DOUBLE IMPELLER**  
**IMPACT BREAKER**

**Cedarapids**  
 Built by  
 IOWA

**SERVES THE CEMENT INDUSTRY  
 WITH THE FINEST LINE OF  
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**HAMMERMILLS**

produce a much finer quality of material, and size for size, turn out more tons per hour than other similar types of equipment.



**HORIZONTAL VIBRATING SCREENS**

20% to 30% more capacity than other types of screens results from horizontal design and other exclusive Cedarapids screen features.



**HEAVY-DUTY FEEDERS**

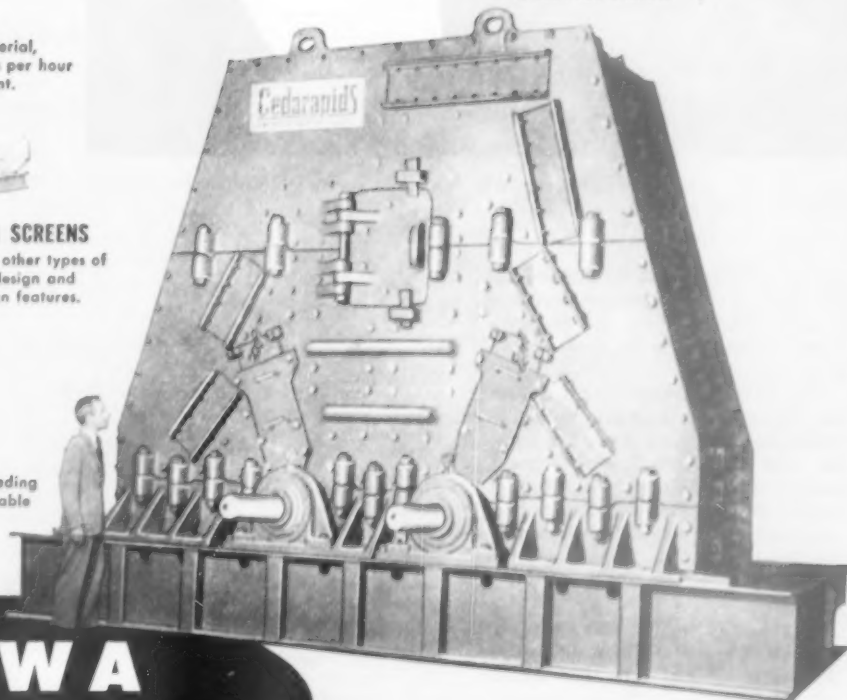
Designed for heavy-duty service in feeding big crushers to assure a smooth, workable flow of material, and withstand the shock of heavy dumping.



The Cedarapids Double Impeller Impact Breaker's reduction ratio of 40 or 50 to 1 is one of the many features which help cement producers step up output and cut production costs for crushing limestone or shale. By reducing 53" diameter material to 3 inches in one pass, you eliminate the need for much accessory equipment like secondary crushers, screens, conveyors, etc. Maintenance and operating costs are low. The entire breaking chamber is utilized for breaking rock against rock, so there is approximately 50% less contact of stone against metal. Wear on hammers and breaker bars is reduced and horsepower requirements are cut. For the complete Double Impeller story, see your nearest Cedarapids distributor or write for Bulletin CC-3.

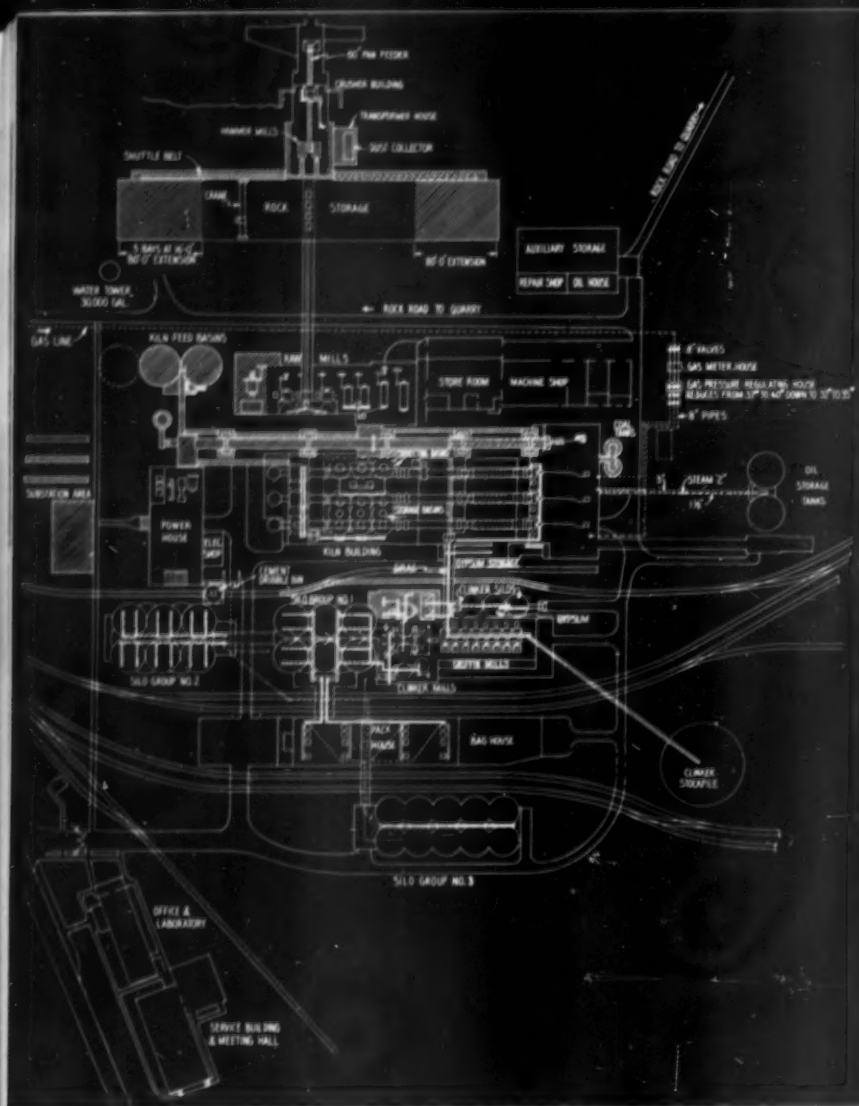
The big Model 5360S, owned by Huron Portland Cement Co. of Detroit, is reducing extremely hard shale to 3" at a rate of 300 tons per hour, with practically no maintenance! This company is also using a Cedarapids 50" x 14'6" heavy-duty cast manganese feeder.

A Kansas limestone producer is turning out 800 tons per hour with a Model 5360H, and states he could handle greater quantity if desired! This plant also includes a Cedarapids Model CMF heavy-duty feeder, 14 horizontal vibrating screens and two 4024 roll crushers.



**IOWA**  
**MANUFACTURING CO.**

Cedar Rapids, Iowa  
 U. S. A.



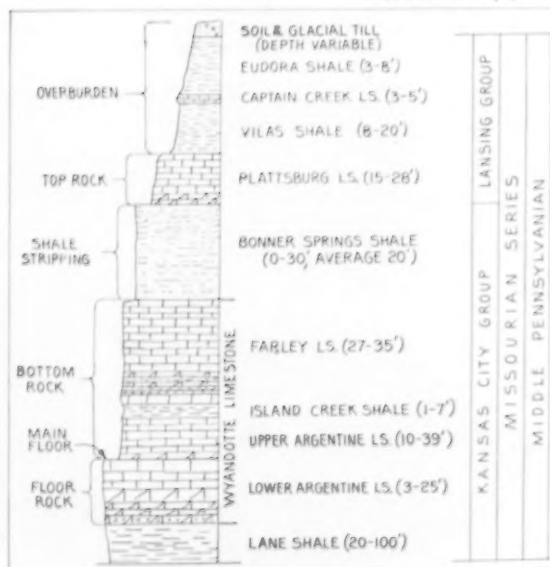
Layout of Bonner Springs plant with new facilities built during 1955 expansion program shown by shading

double-screw conveyor feeding the ball mill product to the separator. Referred to as a Thermaveyor, the conveyor substantially lowers the cement temperature.

The 1955 building program at Bonner Springs also included new dust collectors in the stone plant, kiln building, and finish grinding department, and a new stockpiling belt conveyor to handle clinker to outside storage. This installation was needed to supplement existing silo storage capacity of only 10,000 bbl.

Selective quarrying, based on close chemical control, is a key feature of the quarrying operation. The accompanying profile indicates that the quarry is developed in horizontally-bedded limestones and shales of Middle Pennsylvanian age. Four levels are being worked in order to supply complete plant needs. These comprise the "top

**Quarry profile**, illustrating the use of selective quarrying to obtain the proper chemical composition of cement. Following overburden removal, the four levels are worked separately. The "bottom rock" or third level is the principal working face, supplying most of the plant feed. The floor rock, containing siliceous limestone, is used primarily for Type II cement.



rock" (Plattsburg limestone); the Bonner Springs shale; the "bottom rock" (which includes the Farley limestone, Island Creek shale and Upper Argentine limestone); and the floor rock (Lower Argentine limestone).

The principal working face is the "bottom rock" or third level, which is used in its entirety. This level averages 30 ft. in thickness and has an average  $\text{CaCO}_3$  content of 85 percent. It is drilled with a 14- x 14-ft. pattern, and shot (in double rows), using Hercules 60 percent gelatin and millisecond delay caps. The Bonner Springs shale, which is a hard blue shale interbedded with thin sandstones, is used to control the raw mix. Because of its abundance (20 ft. thick), part of the formation is wasted. It also is drilled and shot, but using a wider spacing pattern than on the third level. The general practice is to shoot a large section at a time, after which the muck pile is allowed to weather for a long period to facilitate loading. The "top rock", predominantly high calcium limestone, is used partly for cement, and partly for aggregates. The floor rock, a siliceous limestone, is used in the manufacture of Type II and oil well cements, which require high silica content.

The overburden, consisting of thin glacial till underlain by interbedded shales and limestone, varies from 20-40 ft. thick; it is excavated by shovel without recourse to blasting. Primary drilling in the top three levels is handled with a Joy 56BH electric rotary drill, putting down 6-in. holes; the floor rock is drilled with a wagon drill. Four electric Bucyrus-Erie shovels are used in loading; these include a 120B (4½ cu. yd. bucket), two 100B's (3- and 4-cu. yd. buckets); and a 50B

(Continued on page 126)





For severe operating  
conditions in rotary kilns . . .

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This leading brand of 70% alumina refractory owes its extremely wide use for rotary kiln linings to its unusual combination of desirable properties. Its high density and low permeability account for its excellent resistance to penetration, such as promotes fluxing. ALUSITE is strong and highly resistant to mechanical stresses, abrasion and thermal shock.

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erties. The close size tolerance and excellent workmanship of ALUSITE radial blocks, arches and wedges make for easy, close fitting linings.

ALUSITE excels in its use in high temperature zones of rotary kilns or in the zones beyond the basic refractory linings where such are needed. It is equally favored for linings of kilns used for burning cement, lime, dolomite, magnesite and other minerals requiring high temperature treatment.

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**"why do you insist on ESCO buckets?"**

**"Service plus dependability"**  
says James E. Shroyer, Plant Manager  
The Auglaize Stone Company



This ESCO Dipper has handled a 3300-lb. steel ball many thousands of times without breakdown.

"An example of ESCO service would be the cooperation we received on a special problem caused by handling a 3300-lb. steel ball to crack large rock," said James E. Shroyer. "In 1948 ESCO designed us a special bucket to handle the drop ball. Since then we have never had any serious trouble. The service on that problem helped sell us completely on ESCO." Auglaize Stone Company is one of the largest suppliers of stone aggregate to prime contractors in northwestern Ohio.

If you have a bucket problem, see your ESCO dealer or write direct.

(1 3/4-cu. yd. bucket). The quarry haulage fleet consists of seven Mack trucks hauling 12-ton loads, and two Dart 20S end-dumps handling 20 tons each; three of the Macks are end-dumps and four are fitted with Easton side-dump trailers. The one-way haul averages 1/2 mile.

Primary crushing (to minus-8 in.) is effected by a 36- x 60-in. Fairmount roll crusher, which is driven by a 250-hp. motor; it is fed by a 60-in. x 45-ft. Pioneer variable speed inclined pan conveyor at a 400 t.p.h. rate. Both the crusher and the primary feeder-hopper are served by a monorail carrying a power-operated hook used for loosening hung up rocks. Operation of the Easton hoist and the primary feeder is conveniently handled from the crusher station (i.e., at the feeder discharge point).

The crusher discharges to a 48-in. x 53-ft. Rex inclined pan conveyor, the load being split to two 5040 Bulldog Non-Clog hammermills. Each mill is driven by a 300-hp. G.E. motor and discharges minus 1/2-in. stone to a 30-in. Rex bucket elevator serving the storage area. The two elevators discharge either directly to storage or to a reversible 24-in. shuttle belt conveyor, 180 ft. centers. Dust in the crusher building is minimized by a Sly 18A Dynaclone operated in conjunction with a 13,800 c.f.m. industrial fan; this unit vents the crushers, bucket elevators, and the collecting-end of the shuttle conveyor. The collected dust is taken to storage by a 9-in. screw conveyor.

The present rock storage is 54- x 368-ft. in size, 80-ft. having been added on each end during the 1955 building program. Total capacity is 12,000 tons, with sections set aside for "high" rock, "low" rock, high silica rock, and shale. The new shuttle conveyor serving the entire storage area is mounted on 5 ft. wide rails; track wheels are spaced on 10-ft. centers. The 24-in. conveyor and the shuttle assembly are driven by reversible 15-hp. and 10-hp. G.E. gear motors, respectively, which are mounted on the tail end. The belt and shuttle speeds are 350 and 125 f.p.m., respectively (in either direction). A 10-ton Whiting overhead crane, carrying a 3-cu. yd. bucket, handles the stone in storage. It also is used in preliminary blending, the material being fed to a battery of four draw-off bins (located in the center of the structure) according to mix desired. These bins discharge through clamshell gates to a 24-in. inclined conveyor, 223-ft. centers, which leads to the four preliminary raw mill feed bins in the raw-mill building.

(Continued on page 129)



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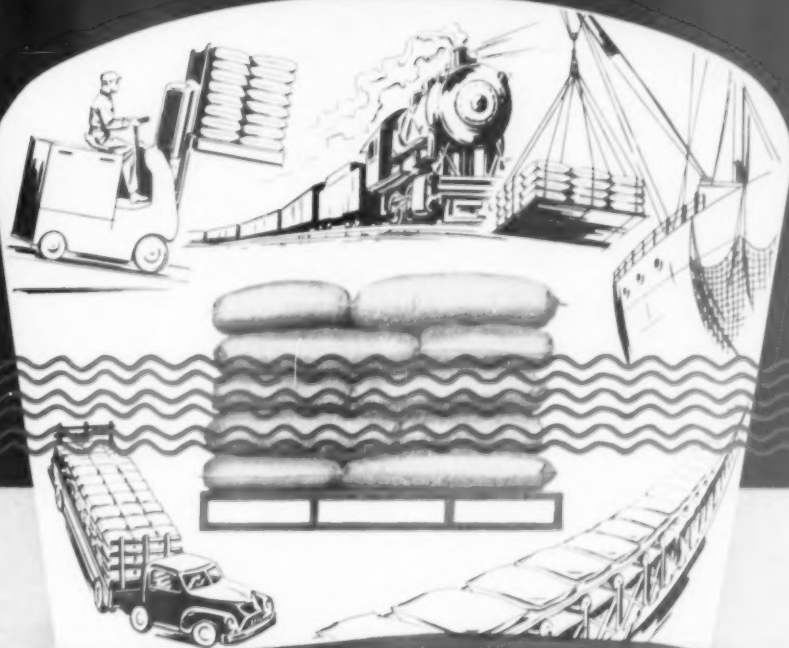
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One of three Barber-Greene Loaders owned by Laverne R. Falk of St. Ansgar, Iowa.

L. R. Falk, Iowa contractor, writes:

## "Why I bought my third Barber-Greene Loader"

"We usually load a seven-ton spreader-truck in two minutes . . . handle 1500 tons in a ten-hour day. Our repair costs have been almost nil. Recently, we added a third Barber-Greene to the job.

"Our ag-lime piles are often damp, and in the winter covered with a thick frozen crust. When this material is dumped into a truck—say, three fourths of a yard at a time—it packs

and is tough to remove. But our Barber-Greene Loaders pulverize lumps and crust . . . fill the truck in a loose, continuous stream that doesn't pack or clog.

"Simple operation lets our truck drivers and most of our customers' drivers easily operate our Barber-Greene's themselves."

Mr. Falk's report is typical of the 543's outstanding performance every-

where. This versatile loader moves from job to job at 15 m.p.h. . . handles any bulk material including coal or snow . . . its hydraulically controlled swivel discharge conveyor saves valuable truck time. For loading from pits and banks and screening or scalping, Barber-Greene builds the crawler-mounted 82A. Barber-Greene Bucket Loaders are the lowest-cost method of truck-loading from stockpiles.

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Hood of new 10- x 340-ft. kiln. Older kilns, to the left, share same burner floor

**Preliminary raw grinding** is done through one new 10- x 12-ft. 2. in. Traylor ball mill and three 8½- x 5½-ft. Smidth Kominuters, which are in closed circuit with vibrating screens. The ball mill is fed by a Hardinge size C Feedometer, is driven through gear and pinion at 18.6 r.p.m. by a G.E. 600-hp. 225 r.p.m. synchronous motor, and is equipped with inching control. Lined with Kenchrome manganese steel with Oro renewable lifter bars, the mill carries a ball charge of 100,000 lbs. of Sheffield forged heat-treated carbon-manganese steel balls graded from 1½ in. to 3½ in. size. Capacity is 75 t.p.h., with a moisture content of 35 percent. The mill is closed circuited by bucket elevator to a pair of 5- x 6-ft. Allis-Chalmers

Ripl-Flo screens fitted with Ton-Cap cloth (.039-in. openings).

The Kominuters, carrying 12,000 lb. of Moly-Cop balls grading in size from 1¼ in. to 4 in., are driven at 21.5 r.p.m.; they are closed circuited to Tyler-Hummer screens, also with .039-in. openings. Throughs from the five screens are transferred by enclosed screw conveyor to an agitating catenary trough, which feeds the three secondary tube mills by gravity. These consist of two 6½- x 20-ft. Smidth mills, each carrying a 35,000-lb. charge, and one 6- x 24-ft. Allis-Chalmers mill, carrying 38,000 lb. of balls; these mills are driven at 32 r.p.m. Final grinding to 94 percent passing 200 mesh is done in a 7- x 26-ft. Traylor mill carrying an 85,000

lb. ball charge. Grinding balls for the tube mills are forged steel, ¾- to ½-in. in size. A 3-in. Morris pump (or standby bucket elevator) delivers the secondary product to the Traylor tube mill, and a 6-in. Wilfley pump transfers the slurry, at 35 percent moisture content, to the blending and storage basins.

Three 700-bbl. tanks and three 1600-bbl. tanks, which are part of the old plant and are located in the kiln building, are used for mix correction; and two new 3000-bbl. tanks erected adjacent to the new kiln (feed end) are used for slurry storage. (In the earlier operation, the three smaller tanks were correcting; the three larger, kiln feed). The correcting tanks are equipped with both mechanical and air agitation. Four 4-in. Morris pumps are used in the blending operation, and two 6-in. Morris pumps (one standby) transfer the corrected slurry to the kiln feed tanks.

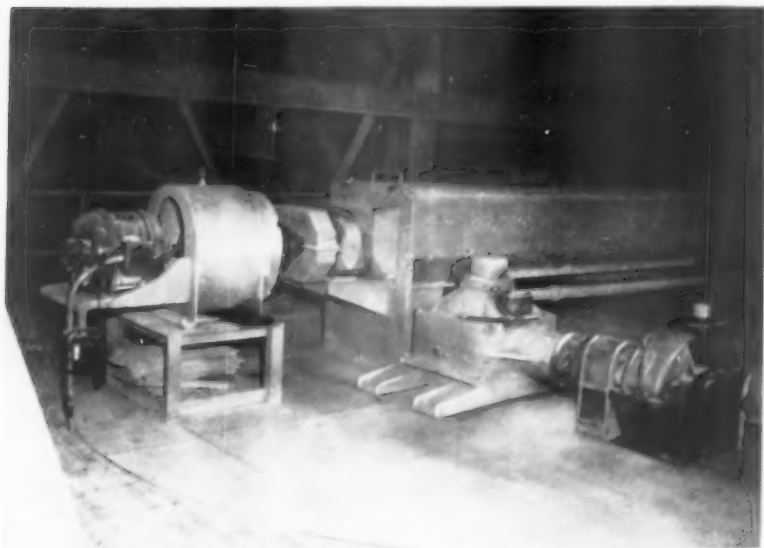
The new storage tanks are 38-ft. dia. x 25-ft., and are fitted with Manitowoc mechanical-air agitators; a Fuller C60 rotary compressor supplies the air. Transfer of slurry between the two tanks and from the tanks to the kiln ferris wheel feeders is by two 6-in. Morris pumps (one stand-by).

To facilitate the erection and maintenance of the slurry pipe lines, the company adopted a color coding system for the piping, involving the use of six colors. These distinguish the lines serving the raw mills, the three small correcting tanks, the three large correcting tanks, the storage tanks, the kiln feeders, and feeder overflow. Another feature is the use of A.C.F. roundport lubricated plug valves in the slurry piping system.

**In the kiln department** the three 8- x 9- x 219-ft. Worthington kilns and the new 10- x 340-ft. Traylor unit share a common burner floor. Each is fed with a ferris wheel bucket-type feeder, which is synchronized with the kiln drive motor. The older kilns are operated in conjunction with Raymond Imp mills and Worthington 6- x 8- x 76-ft. coolers, whereas an automatic Raymond 473A bowl mill and an Allis-Chalmers air-quenching grate cooler serve the new kiln. The coolers are mounted counterflow to the kilns, and discharge to a 90-ft. Smidth Skulpter conveyor, which leads to the finish grinding department. Unlike the smaller kilns, the new kiln is equipped with an induced draft fan.

The 340-ft. kiln is an all-welded unit having a ¾-in. shell and five floating-type tires, is sloped ⅞ in. per foot, and is enclosed to the drive pier. It is equipped with a Traylor air seal at

(Continued on page 136)



Water-cooled, twin-screw conveyor carrying finish mill product to air separator reduces cement temperature

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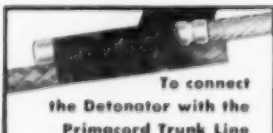
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use FRICTION TAPE. You can detonate Primacord with fuse and cap or electric blasting cap. Lay the cap alongside of the Primacord with the business end of the cap pointing in the direction that the Primacord will detonate. Tape the two snugly together, so that you have a tight connection.

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Use this HALF HITCH for Plain and Reinforced Primacord. Draw it up as tight as you can, and be sure the Branch Line leads off at a **RIGHT ANGLE** to the Trunk Line.



**To connect a  
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Reinforced or Plastic  
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use this DOUBLE HITCH in the textile-covered Primacord Trunk Line. Draw it up as tight as you can, and make sure that the Branch Line leads off at a **RIGHT ANGLE** to the Trunk Line.



**To lengthen a Trunk Line**  
of Plain or Reinforced Prima-  
cord, tie a **SQUARE KNOT**. Draw it up as tight as you can — It won't slip back. Caution: don't use any knot in a hole — it might break or hang up explosives when loading.

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**ARC WELD SURFACING**—The Lincoln Electric Co. has published "Lincoln Welddirectory", (Bulletin SB-1352), discussing application, properties of deposited metal and procedures for welding and surfacing of stainless steels, non-ferrous metals, and cast iron. A detailed discussion is also given of hard surfacing in terms of service required, service conditions, part to be surfaced, dimensions, and finish required.

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**BULLDOZERS** — Caterpillar Tractor Co. has released an 8-page booklet, Form No. DE616, titled "Cat-Built Bulldozers . . . The Answer to Profitable Earthmoving". It contains photos of the machines in action and indicates the selection of attachments.

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**CASTABLE REFRACTORIES** — Pibrico Co. has released "Pibcast Castable Refractories", listing 23 different grades and classifying five categories. Advantages and characteristics are described in the illustrated booklet.

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**CONTROL VALVES**—The Oilgear Co. has released Bulletin 80300, a 16-page booklet describing its three- and four-way directional control valves for fluid power systems up to 3000 p.s.i. Included are details of the valve body construction and functions of standard and special plungers. A choice of plungers and flanges is offered in the four styles of operators, mechanical, manual, hydraulic and solenoid pilot.

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**CRANES**—Koehring Co. has issued a bulletin, "Koehring Cranes for Industry" (K474) which is an illustrated discussion of the firm's complete line of crawler and rubber-tire mounted cranes for use in all types of industrial material handling work.

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**CRAWLER TRACTORS** — International Harvester Co. has published 8-page folders describing its new line of diesel crawler tractors. Booklet CR-491-F describes the 41.5-hp. TD-6; CR-490-F, the 54.5-hp. TD-9; CR-489-F, the 78.5-hp. TD-14; and CR-488-F, the 103-hp. TD-18.

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**DIESEL APPLICATIONS**—General Motors Corp., Detroit Diesel Engine Division, has published a reference booklet listing over 1000 models of construction and industrial equipment now available with Detroit Diesel engines as standard or optional power. Over 150 manufacturers are represented.

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**DIFFERENTIAL METERS**—Bailey Meter Co. has released Product Specification P-22-6, discussing its new line of high-head differential pressure transmitters, which now measure and transmit high pressure-high velocity flows on a linear flow basis.

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**DITCHER**—Gar Wood Industries, Inc., has published a 16-page catalog covering the recently introduced Gar-Wood-Buckeye 305, 307 and 308 pipeline and utility ditchers. Incorporated in the illustrations are a number of engineering developments including the Gar-Wood-Buckeye hydraulic conveyor drive, live hydraulic wheel hoist controls and traction and digging transmissions.

Enter 508 on Reader Card

**DUMP BODIES**—Hercules Steel Products Co. has published Bulletin No. 154 describing Model SD series 2-cu. yd. dump bodies. The 2-page catalog discusses and illustrates Model SD-12 with fixed sides and Model SD-1 with removable sides and rear corner posts.

Enter 509 on Reader Card

**DUST COLLECTION**—Torit Manufacturing Co. has issued Booklet S6, "You Can Solve That Dusty Cost Problem", which describes the principles of unitized dust collection, its advantages and savings.

Enter 510 on Reader Card

**GAS ANALYZER**—Arnold O. Beckman, Inc. announces Bulletin 119 describing the Model 7C Thermal Conductivity Analyzer for measurement of gases. The operating principle is illustrated and technical data are provided about the analyzer, in each case manufactured individually to meet the requirements of a particular application.

Enter 511 on Reader Card

**HIGH SPEED WELDING**—Air Reduction Sales Co., a division of Air Reduction Co., Inc., announces the availability of a 12-page reprint (Form ADR 100) from *Welding Journal*, "High Speed Welding of Steel Compressor Cases", by C. F. Stephenson, York Corp., and R. A. Stone of Air Reduction.

Enter 512 on Reader Card

**HYDROGEN PEROXIDE CHART**—Solway Process Division, Allied Chemical and Dye Corp., has prepared a durable, plastic-treated wall chart that outlines the safety rules to be followed in handling hydrogen peroxide.

Enter 513 on Reader Card

**INDUSTRIAL HYGIENE**—Industrial Hygiene Foundation of America, Inc., Mellon Institute, has published a bulletin on "History of Industrial Hygiene Foundation" which discusses the foundation's two decades of service in the field of occupational health problems.

Enter 514 on Reader Card

**INDUSTRIAL TRACTORS**—Massey-Harris-Ferguson, Inc., Industrial Division, has issued a 24-page bulletin describing its new line of M-H-F Work Bull rubber-tired 34-52 hp. tractors, including Models 202, 303, 404, 202 Fork-lift, and Davis Pit-Bull. Also included is a description of backhoe, bucket loader, dozer blade, and other front and rear attachments.

Enter 515 on Reader Card

**MATERIALS HANDLING EQUIPMENT**—Syntron Co. has issued Catalog S64, containing 50 pages of technical data, description and photographs of its complete line of vibratory materials handling equipment, other industrial equipment and power tools.

Enter 516 on Reader Card

**MILL FEED CONTROL**—Hardinge Co., Inc. has published an 8-page catalog on its "Electric Ear" grinding mill feed control, Bulletin 42-A. It discusses the operating principle of the electronic device which automatically regulates the flow of feed material and provides information on correct application.

Enter 517 on Reader Card

**NONDESTRUCTIVE TESTING**—Magnaflux Corp. has brought out a new edition of its booklet, "Seeing Isn't Always Believing". Additions and changes are indicative of the progress that is being made in the field of non-destructive testing of materials and parts.

Enter 518 on Reader Card

**PETROLEUM PRODUCTS** — Gulf Oil Corp. has published a booklet "Gulf and Your Business" explaining its service to industry in a 34-state area in terms of production, manufacturing, and research facilities.

Enter 519 on Reader Card

**PLANT CONSTRUCTION**—Western Machinery Co., W. K. E. Division, has released a 28-page folder describing its operations and experience in engineering, design and construction of mines, mills, process plants and other facilities.

Enter 520 on Reader Card

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## FREE INFORMATION

You can obtain catalogs and literature listed on these and other pages of the magazine by entering the number appearing either below or beside the item of interest on the READER-SERVICE CARD at the bottom of this page.

**PORTABLE PLANT**—Nordberg Manufacturing Co. has published "Portable Plant Handbook", Bulletin 238A. Containing 22 pages, the illustrated brochure presents ideas for design and construction of portable and semi-portable rock crushing and screening plants employing Symons cone crushers and vibrating screens. Drawings and specification sheets are included.

Enter 521 on Reader Card

**POWER-STEERED FORKLIFTS**—Towmotor Corp. has brought out a folder, "Greater Maneuverability and Faster Handling with Towmotor Power Steering", giving the advantages of power steering which now can be had as optional equipment on every model in the Towmotor line of forklift trucks of 6000-lb. capacity and over.

Enter 522 on Reader Card

**PUMPS**—The Oiler Co. has issued a 12-page bulletin, 44200-A, describing its "Any-Feed Pumps" which are now built in four sizes: two sizes of pressure compensated, variable displacement, radial rolling piston pumps for pressures up to 1000 p.s.i., and two constant displacement traverse pumps for pressures up to 300 p.s.i. Diagrams and drawings illustrate installation and operation.

Enter 523 on Reader Card

**ROLLER CHAIN**—Link Belt Co. has prepared a 148-page bulletin, No. 2457, describing its line of precision roller chain and sprockets. It includes sections on stock drives, drive chain, conveyor chain, installation and maintenance, lubrication, sprocket wheels, casings, chain tighteners, etc. Information necessary to choose the right roller chain for a given application is also provided.

Enter 524 on Reader Card

**SAFETY MOTORS**—Byron Jackson Pumps, Inc., a subsidiary of Borg-Warner Corp., has compiled a file folder on a new line of sealed, oil-filled motors for hazardous conditions. Illus-

trative material treats of the motors' application in corrosive, flooded, explosive, or dust conditions, and technical data are included.

Enter 525 on Reader Card

**SCRAPER**—International Harvester Co. has released an 8-page folder, Booklet CR-585-F, on its new Model 75 Pyscraper. It enumerates the advantages of the lower-draft frame, greater visibility, cerametallic clutch facings, higher apron lift, bigger pushblock and improved ejector.

Enter 526 on Reader Card

**SPRINGS**—The Colorado Fuel and Iron Corp. has issued a 12-page illustrated booklet dealing with various types of Wickwire springs and formed wire to supplement its previously issued catalog.

Enter 527 on Reader Card

**TESTING VIBRATOR**—Wheeler Company, Inc. has published a booklet on its testing vibrator giving a general description, parts list and instructions for the operation and maintenance of Model 4 machines. Special engineering features are also listed.

Enter 528 on Reader Card

**TORQUE CONVERTER**—Twin Disc Clutch Co. has released Bulletin 507, "Series 13,800 Twin Disc Three-Stage Torque Converter". Illustrations and charts explain the construction and application of the new converter.

Enter 529 on Reader Card

**TRACK ROLLERS**—Caterpillar Tractor Co. has published Form 31931-DE618, "The Inside Story", which deals with track rollers of its D9, D8, and D7 Tractors. Discussed are the design and quality control maintained throughout the production of the rollers.

Enter 530 on Reader Card

**TRACTOR AND EQUIPMENT**—Caterpillar Tractor Co. has issued a 16-page booklet, (Form No. DE6150), "Caterpillar DW20 Tractor and Equipment". Discussed and illustrated are the performance and cost data of Model DW20.

Enter 531 on Reader Card

**TRACTOR, TRACTOR ATTACHMENTS**—Mid-Western Industries, Inc., has brought out an 8-page brochure describing the Davis line of industrial equipment, which includes the Davis Pit-Bull and a complete line of tractor front- and rear-end attachments, such as the Model 185 back hoe, 102 loader, 500 loader, forklift, etc.

Enter 532 on Reader Card

**TUNNELS**—Armco Drainage and Metal Products, Inc., has released an illustrated folder, CS-9456, describing the use of Multi-Plate and Liner Plate for aggregate tunnels. The folder shows actual installations, and gauge tables for both materials are included.

Enter 533 on Reader Card

**V-BELT DRIVES**—Worthington Corp. is offering V-belt Trouble Savers No. 2 V-1400-M38P and No. 3 V-1400-M40P as part of a series of five. Mailer 2 tells how to prevent trouble in Worthington Quick Detachable V-Belt drives and Mailer 3 discusses symptoms, diagnosis, and cures for V-belt failures. Still available is Mailer 1, V-1400-M39P, "How to Spot Trouble in V-belt Drives."

Enter 534 on Reader Card

**VIBRATORY EQUIPMENT**—Eriez Manufacturing Co. has published Brochure VB-1 dealing with its new "HI-VI" line of electro-permanent magnetic vibratory equipment. Applications are listed and operating advantages noted.

Enter 535 on Reader Card

**WELDING PRODUCTS**—Taylor-Wharton Division, Harrisburg Steel Corp., has released a 4-page catalog, Bulletin 3-56-1M providing information about TISCO "Timang" manganese-nickel-steel welding products including rods, hot-rolled plates, special shapes, wedge bars, tooth repointers and applicator bars.

Enter 536 on Reader Card

**WET DUST CONTROL**—Pangborn Corp. has brought out Bulletin 920, describing its new Ventrijet designed for the wet collection of industrial dusts. Fifteen photographs and drawings show the action of the Ventrijet which utilizes the venturi tube principle. Dimensions, weights, and capacities are presented in three tables.

Enter 537 on Reader Card

**WOUND ROTOR MOTORS**—Allis-Chalmers Manufacturing Co. has published Bulletin 51B8195A, "Allis-Chalmers Wound Rotor Motors", explaining the purposes and advantages of the motors which are available in open-type and totally-enclosed models.

Enter 538 on Reader Card

**WOVEN WIRE SCREENS**—Simplicity Engineering Co. announces publication of Bulletin 67, covering its complete line of woven wire screens for repair and replacement. The catalog describes the methods employed to fabricate wire screening to exact specifications, and lists sizes and types available.

Enter 539 on Reader Card

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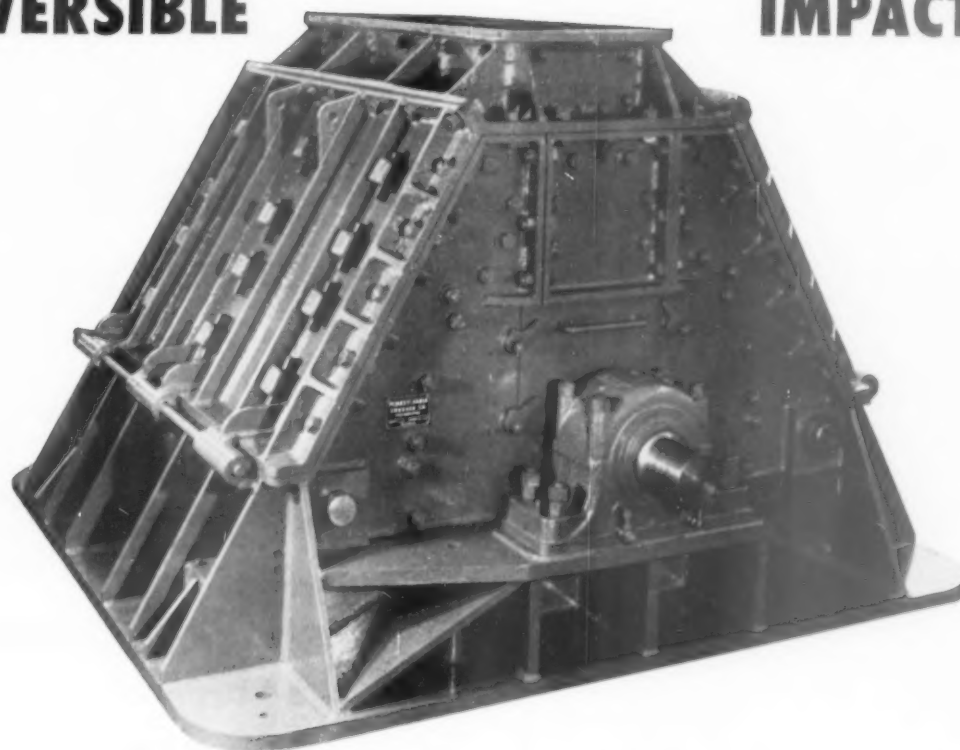
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# PENNSYLVANIA

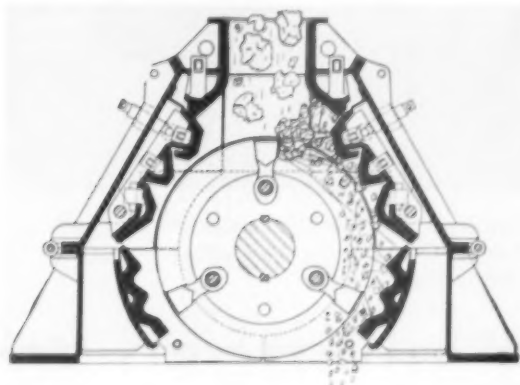
## REVERSIBLE

## IMPACTOR



### THIS CRUSHER HAS MADE, AND IS MAKING, CEMENT HISTORY

In 1937 Pennsylvania designed, built and installed the first Impactor in a cement plant. From the start of operation it was apparent that this machine would have a definite place in the cement and crushed stone industries, but no one could predict its rapid and universal acceptance. Today one or more Pennsylvania Reversible Impactors are installed in 55 plants of 43 cement companies. As is to be expected, the design is imitated but 24 out of 25 Impactors sold to cement plants are Pennsylvania Impactors. Play it safe, buy a Pennsylvania and be sure of low maintenance costs and a uniform product year after year. Whenever you need help on your crushing problems write Pennsylvania Crusher Division of the Bath Iron Works Corporation, West Chester, Pennsylvania.



# PENNSYLVANIA

IMPACTORS  
HAMMERMILLS  
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ON THE JOB: (top to bottom) F-500 load lugger in the quarry makes up to 40 trips a day to crusher. At the plant F-800 spreader loads up. F-800

leaves plant as F-500 dumps quarry load into crusher. F-800 calls on 212-h.p. engine to spread lime over plowed field.

# BIG FLEET OWNERS BUY MORE FORD

# "FORDS ARE COST CRUSHERS- with an extra ton of payload!"

"The F-800's 212-h.p. engine keeps us from bogging down in freshly-plowed fields," says Charles Conklin of Canaan, Conn.



Mr. Charles Conklin, President of Conklin Limestone Company, says:

*"Fords reduce costs on a low profit operation. Our '56 F-800 handles a ton more payload than competitive makes."*

**Extra ton of payload . . .** "We can carry 9 tons in our Ford F-800 spreaders. That's a ton more than we can carry with a competitive make," says Mr. Conklin. "And with a low cost product like limestone, that extra ton means a lot." Payload means a lot in any operation, Mr. Truck Operator. And the Ford F-800 is just one of the Ford Truck line with an eye for better payloads. The new F-800 payload and body allowance is up to 18,445 lbs.!

**72,000 miles with a worry-free V-8 engine . . .** "We have a '54 F-800 spreader with 72,000 miles. The extent of repair to date has been a spark plug change." Ford Trucks can be counted upon to "take it" under the roughest conditions. That's why **FORD TRUCKS LAST LONGER.**

**Powered for the roughest jobs . . .** "Our F-800 spreaders tackle some of the roughest terrain in New England," boasts Mr. Conklin. "But, thanks to Ford power, we never get bogged down."

Take a look at the '56 F-800's power plant. Your choice of the 200-h.p. Torque King or the 212-h.p. Torque King Special—the most powerful engine ever offered in a Ford Truck.

So consider *everything* when you go to buy that new truck—initial price, running costs, dependable performance, and resale value. Check with your Ford Dealer and see why Ford Trucks cost less.

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## TRUCKS THAN ANY OTHER MAKE

Enter 1050 on Reader Card



Two new 25- x 38-ft. kiln feed tanks used for four kilns. New kiln is mounted between row mill building, left, and kiln building

the feed end and an air-cooled nose ring, and is driven by a G.E. 75/100-hp. 230-v. d.c. motor through a Falk gear reducer. The average kiln speed is 70 r.p.m. An International U-264 gasoline engine is provided for standby use. The kiln is equipped with a 73½-ft. chain section, incorporating ¾-in. chain.

Refractory lining consists of 6-in. alumina hot zone brick in the burning zone and 4½-in. brick in the remainder of the kiln, and is of General Refractories, Mexico, and A. P. Green manufacture. Beginning at the discharge end, the lining is as follows: 6-in.—10 ft. of 40 percent alumina, 40 ft. of 70 percent, 20 ft. of 60 percent, and 20 ft. of 40 percent; 4½ in.—143½ ft. of insulating fire brick, 25 ft. of 40 percent alumina cold zone brick, 73½ ft. of abrasive resistant

brick (chain section), and 8 ft. of 40 percent alumina cold zone brick.

The kiln is exhausted through a dust chamber by a Buffalo type SSL industrial fan, which is driven by a 150-hp. G.E. motor; it has a capacity of 80,000 c.f.m. The stack is a 9-ft. dia. x 200-ft. brick-lined concrete structure built by Rust Engineering Co.; the outside diameter varies from 16½ ft. to 12½ ft. A portion of the walkway along the kiln was constructed with 30-ft. precast concrete structural members.

The four kilns are fired either with natural gas, coal, or oil. Gas is preferred; however, coal must be used during the winter when there is a heavy demand for gas for heating. Fuel consumption is normally 1,300,000 B.t.u.'s per bbl. of cement. Piped in from the Texas and western Kansas

fields, the gas has a rating of 930 B.t.u.'s per cu. ft., with 1400 cu. ft. being required per bbl. of cement. Bituminous coal, shipped in by rail from the Pittsburg, Kans. field, has a B.t.u. per lb. rating of 13,000. Coal consumption for the four kilns averages 100 lb. per bbl. of cement. Burning efficiency of the new kiln is considerably higher, with consumption estimated to be about 90 lb. per bbl.

The unit bowl mill serving the new kiln is driven by a 150-hp. G.E. motor and charged by a Hardinge Feedometer through a rotary air lock. The coal is precrushed at the plant to minus 1-in. by a 30-in. Jeffrey roll crusher, and reduced by the bowl mill to 80 percent passing 200 mesh. Coal is heated by air drawn from the hot end of the cooler, the air first passing through a Western Precipitation Multiclone dust collector. By means of automatic dampers, the mill entering temperature and the kiln primary air temperature are maintained at 350 and 180 deg. F., respectively. Coal is blown into the kiln by a Raymond industrial fan through a 12-in. water-cooled burner pipe (tapered to 11-in. I.D. in the last 18-in. section). The gas burner pipe is also tapered, ranging from 2.47 in. to 2 in. (at the discharge end). This serves to lengthen the flame.

The Traylor kiln discharges to a 4½- x 70-ft. Allis-Chalmers style B air-quenching grate cooler, complete with an integral clinker breaker. A 21½-ft. pan conveyor attached to the cooler transfers the clinker, at about 150 deg. F., to the Skipulter conveyor. Cooling air is supplied by a New York Blower type ME fan of 62,000 c.f.m. capacity, which is driven by a 60-hp. Allis-Chalmers motor. The air flow is controlled by a louvre damper operated manually from the control panel and by a revolving pulsating damper, which is synchronized with the pulsation of the cooler grates. By means of a 70,000 c.f.m. fan, the cooler is exhausted to atmosphere through a 6½- x 70-ft. steel stack, the gases first passing through a 12-14 Buell L.R. dust collector. The collected dust is discharged through a Buell 8-in. counterweight non-return valve to a 9-in. Link-Belt screw conveyor leading to the Skipulter.

The new kiln is equipped with the latest control devices, with the gauges, recorders, instruments, indicators, and manual controls centralized on a dust-tight kiln control panel. Recording devices were supplied by Minneapolis-Honeywell and Hays.

The burning zone temperature (averaging 2700 deg. F.) is obtained with a radiation pyrometer and re-

(Continued on page 140)



Instrument panel for new kiln



# Your best assurance for a *continuous* supply is a completely integrated supplier!

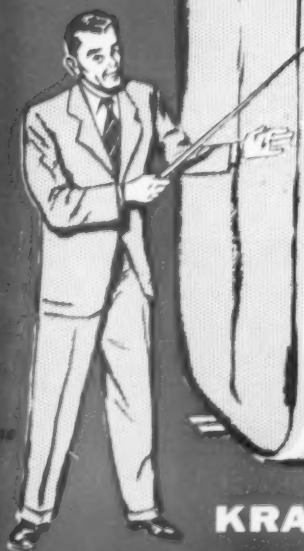
Kraft Bag Corporation comes closest to being the most completely integrated manufacturer of multiwall shipping sacks in the industry!

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Tell us when we may call to discuss your requirements.



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Bleach Plant	✓	
Paper Mill	✓	
Multiple Bag Plants	✓	
Natural Kraft	✓	
Colored Kraft	✓	
Bleached Kraft	✓	
Creped Kraft	✓	
Wax Laminated Kraft	✓	
Asphalt Laminated Kraft	✓	
Wet-Strength Kraft	✓	
Water Repellent Kraft	✓	
Stak-LOK Super Rough Kraft	✓	
Valve Bags — sewn or pasted	✓	
Open Mouth Bags — sewn or pasted	✓	
Flat Sewn Valve Bags	✓	
Flat Sewn Open Mouth Bags	✓	
KRAFT-lok Valve Closure	✓	
Creped Tape	✓	
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Automatic Open Mouth Bag Filling Machine

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# Lined . . . and relined with Lorain . . .

## Primary clinker mill grinds 37,873,000 bbls. of feed efficiently and economically

At Hudson, New York, the Universal Atlas Cement Company has been using USS Lorain Rolled Steel Plate Linings in its grinding mills since 1938. One 10' - 6" x 12' Preliminator alone has ground 37,873,000 barrels of clinker up to February 13, 1956, consuming only two sets of linings and lift bars.

The first lining in this mill was made of 2" liner plates and lift bars, Section M-3714, designed to permit replacement of bars during life of the lining. In grinding the 38 million barrels of clinker, one lining and one set of renewal bars were completely worn out. But despite the tremendous tonnage processed, the second lining installed was still in serviceable condition when the mill went down for general repairs in February.

**HEAVIER-DUTY LINING**—The performance of the original Lorain linings was so impressive that management at Universal Atlas decided to install the latest type Lorain lining with deep recessed liner plates and extra-heavy lift bars, Section M-4497, to further increase the mill's grinding efficiency and to eliminate the need for replacing lift bars. The new type lining was installed during the repair period in February so production would not be interrupted during the peak season this summer. Frankly, no shutdown due to lining problems

is expected for the next several years.

**LONGER LIFE . . . CONSTANT LIFT**—USS Lorain Rolled Plate Linings are made of tough, rolled steel that means longer grinding life. Lift bars are rolled alloy steel, heat treated to obtain a hardness differential that will maintain lift height throughout life of the lining, thus providing maximum grinding efficiency. Each Lorain Lining is tailor-made to fit a particular mill. The linings fit snugly—shell wash is eliminated. Mr. A. E. Glasspool, Maintenance Supervisor at Hudson, said "Lorain Linings are designed right and they fit tight. Each piece was properly marked, so we had no trouble with installation."

These heavy-duty linings installed by Universal Atlas will provide effective grinding action without fear of broken bolts, cracked plates or bars, and will continue to perform efficiently until the plates wear paper-thin.

**WE'RE GLAD TO HELP**—If you are not aware of the merits of USS Lorain Rolled Plate Linings and are not using them—if you are experiencing lining difficulties of any nature, we will be glad to have a sales representative call on you. Just write to: United States Steel, 525 William Penn Place, Pittsburgh 30, Pa.

This 10'-6" x 12' Preliminator mill in Universal Atlas Cement's Hudson, New York, plant has ground 37,873,000 bbls. of clinker at a rate of 360 bbls. per hour.

The specially designed bolts will hold the Lorain Lining snug and tight for the life of the lining without fear of breaking. Lorain Linings are made of tough, rolled steel that is tailor-made to accurate shapes.

Although there was still some life left in the old lining, management decided to install the heaviest-duty Lorain Rolled Plate Lining for even greater grinding efficiency, and to assure continuous operation for several years to come.





These new, heavy-duty lift bars, Section M-4497, and 2-inch-thick liner plates are expected to increase mill efficiency. This lining will retain lift for millions of tons. USS Lorain Rolled Plate Lining successfully grinds until plates are worn paper-thin. USS Lorain-designed special man-holes and covers were also an unusual feature of this installation.

UNITED STATES STEEL CORPORATION, PITTSBURGH • COLUMBIA GENEVA STEEL DIVISION, SAN FRANCISCO TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA.  
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

## USS LORAIN ROLLED PLATE LININGS and USS GRINDING BALLS

UNITED STATES STEEL



Enter 1052 on Reader Card



Covered storage area, 54- x 368-ft., served by 10-ton overhead crane. New shuttle conveyor is mounted in wing on left

corded on a circular chart. Kiln exhaust temperatures, taken in the dust housing and ahead of the draft fan, are recorded on a strip chart; they average 700 and 650 deg. F., respectively. Also recorded (on circular charts) are the coal mill temperature, kiln speed, and gas flow and pressure.

Hays 2-point kiln, cooler, and coal mill draft gauges are also available. The kiln back end draft averages minus 2 in. w.g., while the hood draft is about  $\pm 0$ . The cooler undergrate pressure averages minus 2-3 in w.g. and the cooler fan suction about minus 2 in w.g.

In addition, the control panel is

equipped with ammeter gauges and push buttons for the kiln, cooler, cooler fan, exhaust fan, and coal mill motors; exhaust fan damper position indicator and control switch; warning light for cooler overtravel; high-low blinker lights for coal tank; kiln feed overflow blinker indicating lights; counters for kiln revolution, constant head feeder, and Hardinge coal feeder; and rheostat controls for kiln and cooler drives.

**Clinker grinding capacity** was increased 55 percent in 1955 with the addition of a 10-x 16-ft. 2 in. Traylor ball mill. Clinker and gypsum are

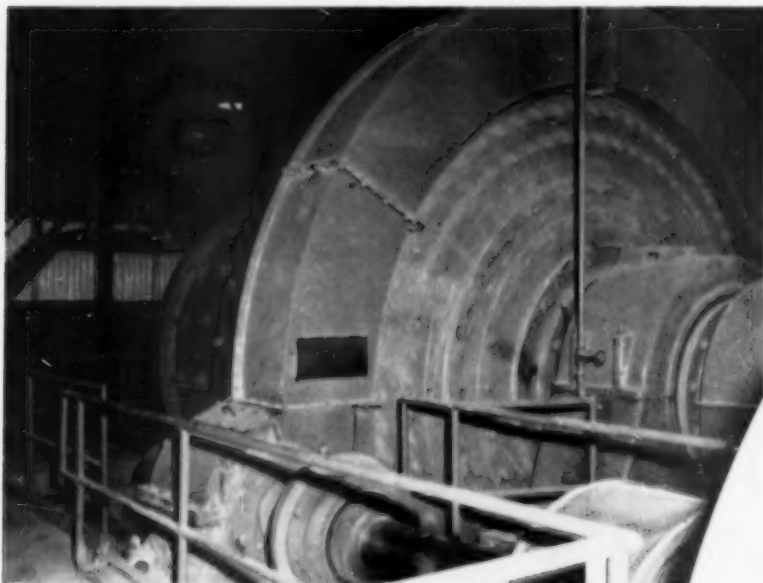
proportioned and fed to the unit from overhead bins by 24-in. Merrick WS Feedoweights. The mill is lined with Kenchrome manganese steel with Oro renewable lifter bars and carries 118,000 lb. of Sheffield forged heat-treated carbon-manganese balls ranging from 1 in. to 3½ in. It is driven through gear and pinion at 18.6 r.p.m. by a G.E. 800-hp. 225 r.p.m. synchronous motor, with inching control.

The mill is closed-circuited to a 16-ft. Sturtevant air separator, the mill product being carried to the separator by a bucket elevator followed by a new water-cooled twin screw Thermaveyor conveyor. This conveyor, manufactured by J. D. Christian Engineers, San Francisco, Calif., has twin 16-in. flights and is 24½ ft. long. Water for cooling is circulated through the conveyor housing and the hollow twin 8-in. conveyor shafts. Initial studies indicate an overall reduction in cement temperature of about 37 deg. F. with a water consumption of 30 g.p.m. The separator returns the tails to the ball mill, the finished cement being pumped to storage. An automatic Norblo dust collector vents the new grinding circuit.

The older grinding circuit is two-stage, and incorporates eight Griffin 40-in. mills (driven by 75-hp. motors) which grind to 40 percent passing 200-mesh, followed by three tube mills grinding to 96 percent passing 200-mesh (same as the ball mill). Clinker and gypsum for the Griffin mills are drawn from a battery of three 3800-bbl. silos and proportioned by Merrick Feedoweights before being transferred to each 200-bbl. Griffin mill bin. Transfer to each preliminary mill is by rotary feeder. Second stage grinding is done with two 7- x 24-ft. tube mills (one Allis-Chalmers and one Worthington) and one 7- x 26-ft. Traylor tube mill, each of which is closed-circuited to a 16-ft. Sturtevant air separator. The larger mill carries 80,000 lb. of balls and has an 80 bbl.-per-hour capacity; the smaller units have 70,000 lb. ball charges and grind at 75 bbl. per hour.

Three F-K pumps transfer the finished cement from the clinker grinding department to silo storage, each pump being used for a different type of cement to prevent contamination. A 6-in. pump handles Type III cement ("Incor" high early strength), a 7-in. pump for masonry cement, and an 8-in. pump for Type I cement. Three silo groups are available, having a total capacity of 280,000 bbl. Each group is vented by a dust collector, two of which are new Sly 8B Dynaclones. The packhouse is equipped with four St. Regis 4-tube bagging

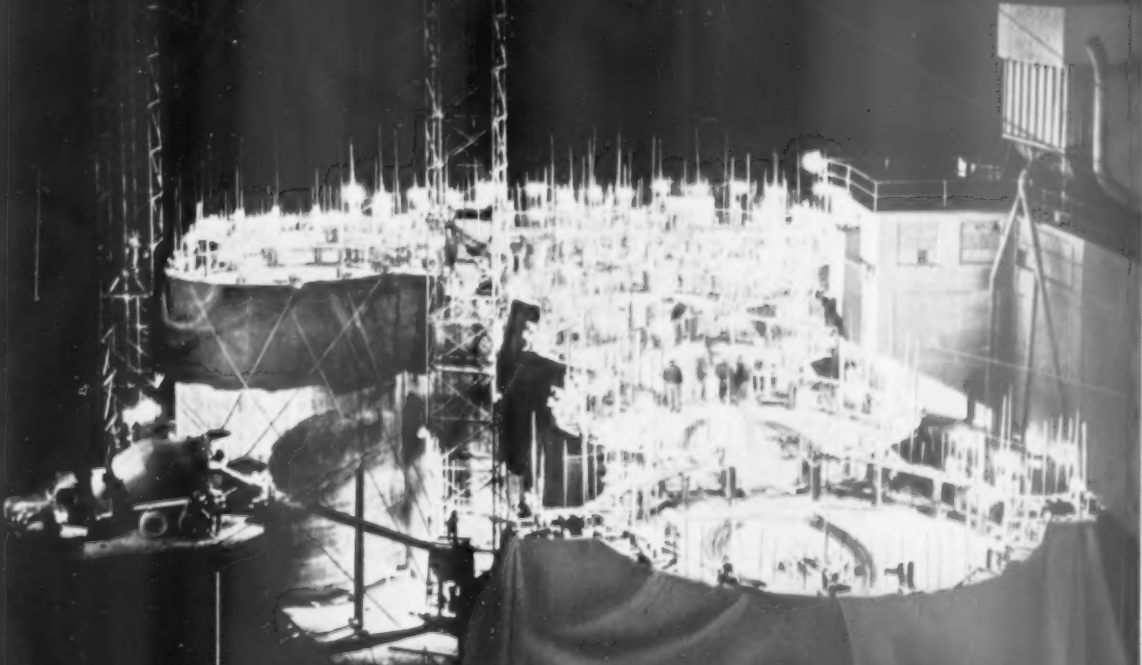
(Continued on page 164)



New 10- x 12-ft. 2 in. ball mill for preliminary grinding has a capacity of 75 t.p.h. It is driven by a 600-hp. motor at 18.6 r.p.m.



# Builders IN CONCRETE



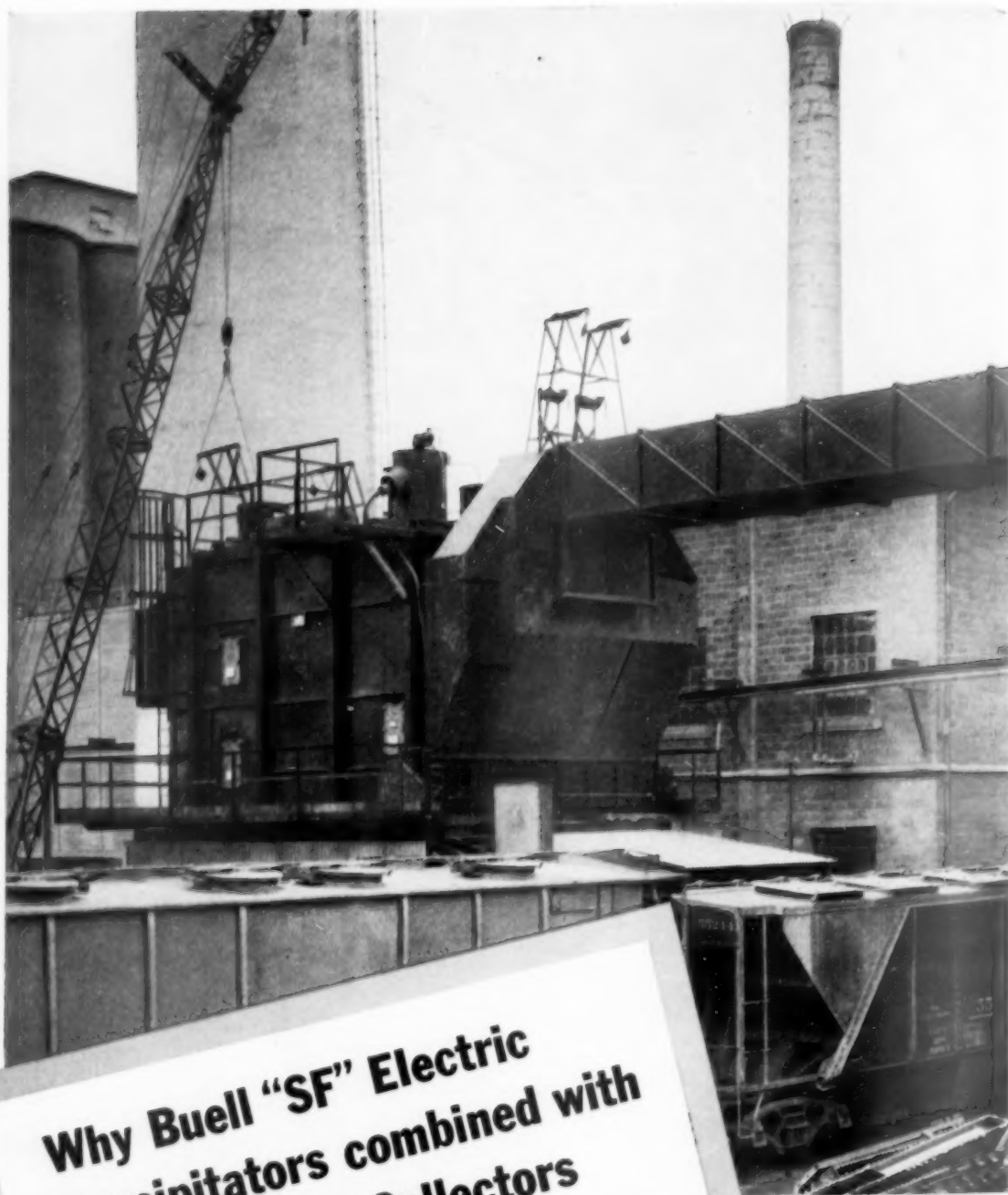
The pouring of this nine unit slip-formed concrete storage is but one current example of Stearns-Roger engineering design and construction of material handling and storage plant facilities.

For your next processing plant,  
take it up with

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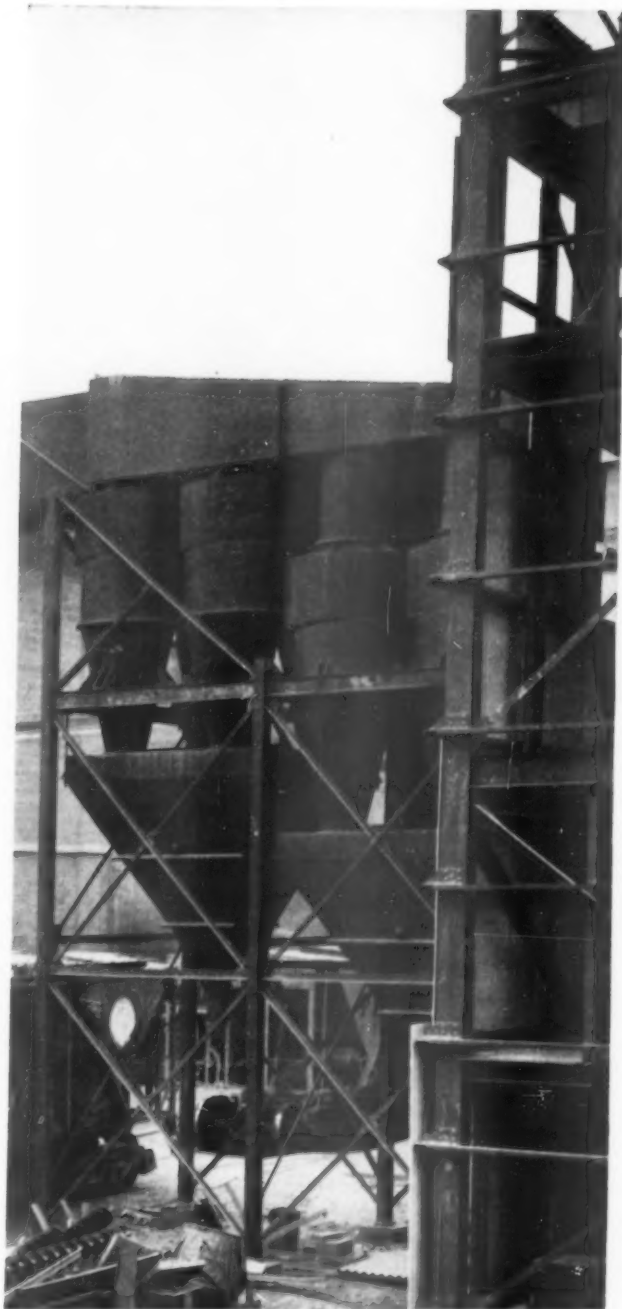
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**Why Buell "SF" Electric  
Precipitators combined with  
Buell Cyclone Collectors  
assure an extra percentage  
of EFFICIENCY**



*Experts at delivering*



**W**hen Buell "SF" Electric Precipitators and Buell Cyclone Collectors are installed in tandem ... you have the ultimate in efficiency *under all conditions*. Because their basic principles of operation are different, they complement each other in such a manner as to provide two important advantages: (1) increased efficiency, and (2), improved stability. For example, changes in the characteristics of dust particles or gases will not appreciably affect the percentage of efficiency of the combined units.

Buell "SF" Electric Precipitators with their exclusive "Spiralelectrodes" are unequalled in the recovery of fine dust particles. Featuring continuous rapping and many other exclusive design advantages, they are your guarantee of that all-important extra percentage of efficiency—often the difference between a highly profitable recovery operation and a break-even one.

Buell Cyclone Collectors with their large diameter, clog-proof design, also offer you the kind of efficiency that results in many extra tons of recovered valuable dust. Whereas the secondary air currents in most collectors tend to lower efficiency, Buell's exclusive shave-off design utilizes them to recover more dust.

For detailed information on how Buell equipment is delivering that all-important extra percentage of efficiency in the cement and lime industry, write Dept. 17-H, Buell Engineering Company, 70 Pine Street, New York 5, New York.

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*Describes all three  
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*Extra Efficiency in* **DUST RECOVERY SYSTEMS**

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ROCK PRODUCTS, August, 1956

143



A fifth kiln has been added by Colaveras Cement Co., at the San Andreas, Calif., plant which will boost production one million barrels. Inspecting the 360-ft. kiln are Arthur Stauber, erection engineer, and chief engineer O. E. Duling

## Industry Booming on Pacific Coast

By W. B. LENHART

### POPULATION GROWTH

... has had a terrific impact on industry expansion, home building and highway development creating heavy demands for cement and aggregates

**D**URING WORLD WAR II and for several years that followed, the portland cement industry on the West Coast seemed to be marking time. No new plants went into operation and expansions, such as they were, did not reflect the near-boom conditions that existed in most of the area, particularly in California. A few kilns were added, and two dormant plants were revitalized. In the Palm Springs area of Riverside County there was much newspaper talk about new plants by new faces in the industry, but no actual work has been done and the proposed operations appear to be dead.

During the same years there was a constant flow of people moving into the coastal states. New basic industries came into being and eastern manufacturers established branch plants. The net result was that the overall growth picture, especially in California, became one of the wonders of the century. Obviously, under such conditions, the portland cement industry enjoyed a seller's market. Ready-mixed concrete plants were hunting cement.

Finally, the giant industry started to move; in 1955-56 practically every company and plant in California and Oregon had something to report in the way of a new plant, or a major plant

expansion. This flurry of new work was more pronounced in southern California than in any other section. Activities in the Northwest compare favorably with those in the central California areas. In Oregon, two kilns are new additions; a new kiln, more grinding capacity and changes in distribution practices have been installed

in British Columbia; and ground has been broken and construction work started on an entirely new portland cement plant in Vancouver, B. C.

**Growth in the cement industry** still continues. Sometime in 1957, California will have three plants that can

(Continued on page 148)



New approaches to the San Francisco-Oakland Bridge are part of the big construction program of California State Highway Department





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*Engineers and Machinery Manufacturers*

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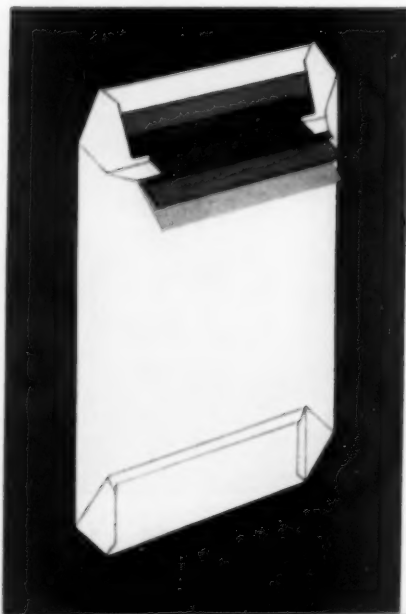
# The Man from

## takes steps to bring you a Multiwall

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**HE'LL TELL YOU WHY THE CEMENT INDUSTRY HAS BOUGHT MORE THAN 150 MILLION ST. REGIS STEPPED-END BAGS**

Because the Stepped-end Bag was invented by the European manager (Mr. Edgar Hoppe) of our International Division . . . because we've been turning out these bags since 1949 . . . and because we've checked their performance under all sorts of conditions, the Man from St. Regis can give you facts and figures based on actual experience.



**COSTS LESS THAN SEWN BAGS** — For instance, you should see a little table of comparative savings of the St. Regis Stepped-end Bag over sewn bags. It shows a range of savings from \$1.30 per M to \$1.45 per M depending on the bag construction. In addition, one company, by using the St. Regis bag, found it possible to reduce the basis weight of their bag from 170 lb. to 150 lb., resulting in a yearly saving of \$14,000 on mortar production alone.

**BREAKAGE IS LESS** — It's a proven fact that Stepped-end Bags have reduced bag breakage in the cement industry. For instance, by using the St. Regis Stepped-end Bag:

Company A reduced breakage to .2 of 1%  
Company B reduced breakage to .1 of 1%  
Company C reduced breakage to .28 of 1%

**IMPROVED APPEARANCE, STACKING, HANDLING** — The square-shaped package looks better . . . and the butt printing on either end allows easy identification of the product. As for stacking and handling—just ask the users (we'll supply names if you'd like). They'll tell you that the smooth ends make for neater stacking, easier handling.



# St. Regis

Bag that cuts packaging costs

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Multiwall Packaging Division

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Please send more information about the St. Regis Stepped-end Bag.

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*Behind the Man from  
St. Regis stand ex-  
perts in every field of  
packaging, ready to  
serve you.*





Photo—Courtesy Santa Cruz Sentinel-News

**Aerial view** of Santa Cruz Portland Cement Co. plant which was recently taken over by the Pacific Coast Aggregates, Inc., San Francisco, Calif.

turn out 59,000 bbl. of portland cement per day. One of these plants will produce 24,000 bbl. per day and the other two 17,500 each. On the national scoreboard, California will have the second largest plant in the United States, and will have two plants tying for third place as giants in the industry. Yet, with all this new productive capacity, there is a feeling that production and consumption will be somewhere near balance, but in favor of a seller's market, and by 1962 more plants will be needed.

**Distribution of portland cement** by trucks, with emphasis on California producers, is a universal practice. Possibly 60 percent or more of the total output in California is shipped by bulk trucks that are either company-owned or privately-owned. In most cases, the haul distance is within a radius of 100 to 125 miles from the producing plants. In southern California, company-owned trucks seldom go outside the borders of the state. However, operators in central California who have company-owned trucks deliver into Nevada. For the high Sierra roads, snow-swept at times, two-axle drive semi's with four wheels per axle are used to give added traction. Contractors and dealers in Nevada and Arizona haul bulk cement in their own trucks from southern California; also into Utah.

The balance between company-owned and privately-owned trucks is watched closely. The optimum condition is one which, if bad weather or a slack construction period develops, the company truck can operate at near peak efficiency. The ratio of company-owned to privately-owned trucks varies from company to company, but a good guess is 60 to 40 in favor of the company-owned vehicles.

Delivery of portland cement by ocean-going carriers is an important part of West Coast activities. One company delivers from the Bay areas to Portland, Ore., where the cement can be unloaded to silos, or reloaded to barges and hauled by tug boats up the Columbia river to the Tri-City district of Washington (Pasco-Richland-Kennewick). The latter is one of the important atomic energy districts of the west. This haul is probably the longest inter-coastal haul in the country, although water shipments are made to Hawaii and other far Pacific Ocean points.

**Technological advances** in the West Coast industry are numerous. Installations include what is probably the longest kiln in the world, a ball mill 13 ft. in diameter, and liquid cyclones as classifiers in the wet grinding circuit.

Some producers are studying the relative merits of long ball mills vs. the shorter ones. Many ball mills in the mining industry have a greater diameter than length. Ball loading in ball and tube mills is being watched by many.

In the section covered by this review (primarily the coastal markets) there are 12 companies with 18 plants; 17 of these producing units serve the important areas near to waters of the Pacific Ocean. One company, the Oregon Portland Cement Co., has a plant in eastern Oregon. That area, as well as eastern Washington, is not included in this review. Brief outlines of important plant and company developments are given.

**The Calaveras Cement Co.**, San Andreas, Calif., placed a fifth rotary kiln in operation on June 13 of this year. It is 11-ft. 3-in. in diameter and 360-ft. long. The kiln and its cooler are

both Allis-Chalmers Manufacturing Co. units. The plant operates wet. This installation will raise the annual capacity of the plant a million barrels to a total of 4,500,000 bbl. On the raw side, a 9 x 9-ft. preseparator was installed. A 9 x 25-ft. tube mill equipped with a 16-ft. Sturtevant air separator was installed on the finish side. Both are Marcy mills. Fuller-Huron Airslides augmented by bucket elevators are now between the mills and the finish silos. The plant has been enclosed with a high wire fence and security measures instigated with plant guards on 24-hr. duty at the main gate.

The company maintains a fleet of 23 company-owned cement haulage trucks, including a few flat racks. The amount hauled by trucks up to this writing was about 95 percent of the plant's production. But with the installation of a new distribution plant in the Oakland industrial area, the amount will be cut to about 80 percent. The new distribution plant started in mid-June, and will receive shipments by truck and rail. No sacking is done at the yard.

To get the new kiln in position, the older office, machine shop, store room and other buildings that were alongside the plant were removed entirely. New and modern facilities were provided for the office and shops. These are of concrete tilt-up construction. Truck-loading facilities have been enlarged. They include a 3000-bbl. bulk bin over a 60-ft. long scale. A similar set-up is at the new distribution yard. Total expenditures run well over \$4,000,000.

A Bucyrus-Erie model 40-R drill is on order and will be used in opening a new quarry. The new unit is a diesel rig and said to be a very mobile unit. It will drill a 9-in. hole. The older rig can drill a 12¼-in. hole, but currently is putting down 9¾-in. holes. The operators may go to 10¾-in. holes.

General appearance of the plant has been improved greatly by the new changes. The plant is located in the heart of the now passive gold mining district of California. A traffic manager works with the transportation and sales sections.

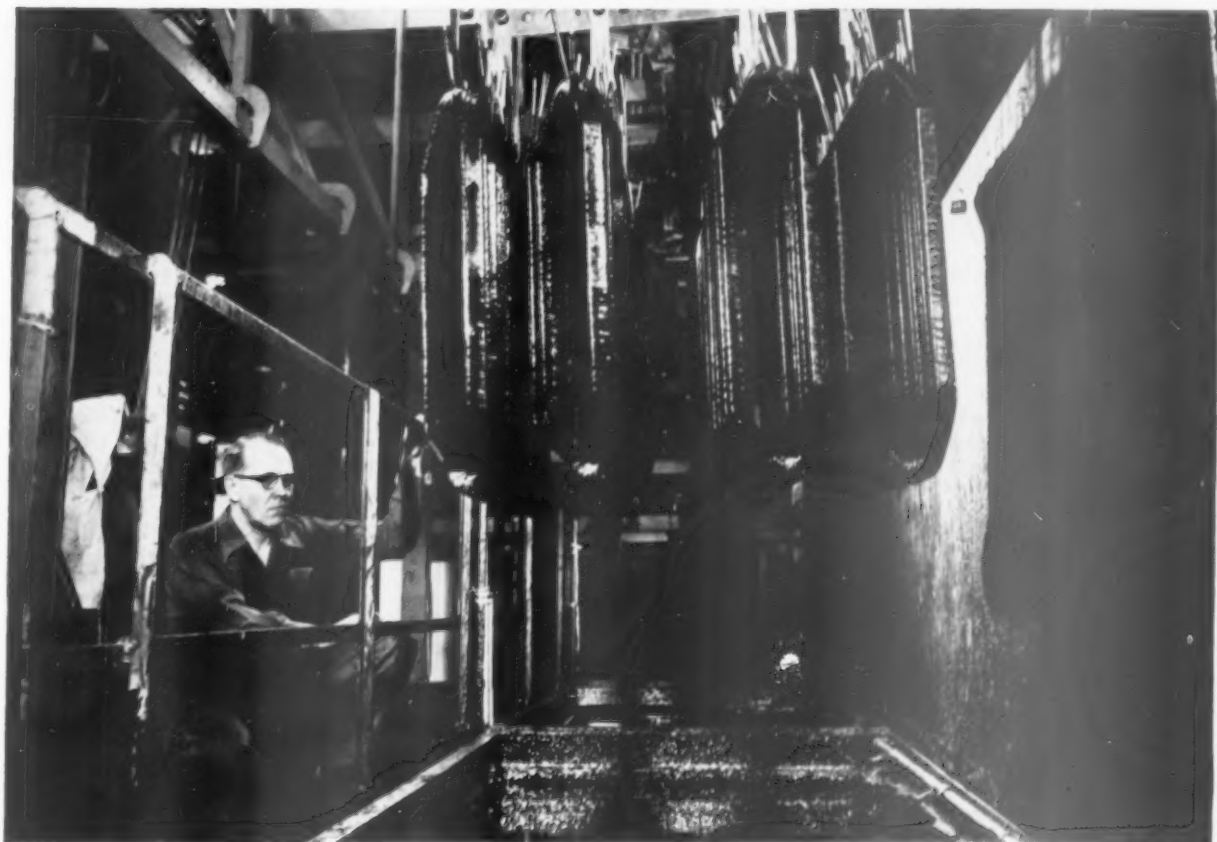
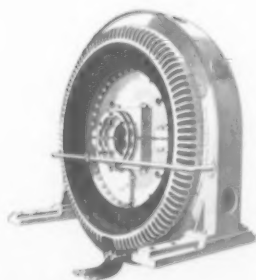
**California Portland Cement Co.** has an older plant at Colton. The new plant at Mojave is described in detail in this issue.

**The Ideal Cement Co.** took over the three portland cement plants of the now extinct Pacific Portland Cement Co. during 1952. The plants are located at Redwood City and San Juan Bautista in California, and at Gold Hill, Ore. The San Juan Bautista plant was dormant for some time. It



**HOW G-E SYNCHRONOUS MOTORS**

**REDUCE MAINTENANCE COSTS**



## ***An insulating bath helps fight moisture***

Moisture has the unhappy habit of working its way through motor coil insulation and reducing its capacity to withstand voltage stress. To guard against exasperating production-line shut-downs, General Electric seals coils with a coating of high-grade insulating resins. This seal is applied by a conveyor belt dip and bake system.

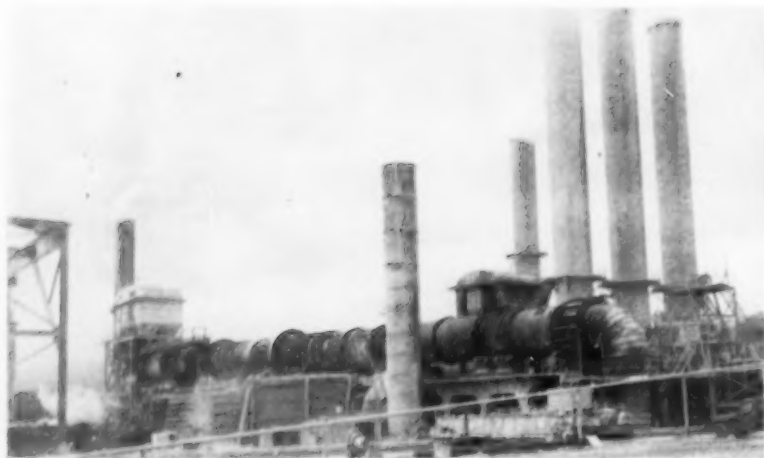
**It works like this.** After the main body of insulation is applied in the form of tapes and films of non-hygroscopic materials, each set of coils is placed on a conveyor and dipped in a bath of special, synthetic insulating materials. This way the coating is uniformly applied. Then the conveyor carries the coils into a huge oven and cures them for a specific length of time. The cycle is

repeated until the proper seal is built up. Each step is automatically and precisely controlled—length of dipping and baking time and temperature.

This means the coils on your G-E synchronous motor are protected by a hard, tough insulation with high dielectric strength and high resistance to moisture and contaminants. Its glossy surface makes the coils easy to clean too.

**All this adds up to less maintenance** and down-time. For more information on G-E synchronous motors, contact your nearest General Electric Apparatus Sales Office or write Section 775-4 for Bulletin GEA-5332, General Electric Company, Schenectady 5, N. Y.

**GENERAL  ELECTRIC**



Looking down 600-ft. kiln at Monolith Portland Cement Co. plant

was reactivated in 1940 by the older company and operated up to 1943, when it was closed. It was reopened in October, 1946, and has been in continuous operation ever since. Improvements in the San Juan and Gold Hill plants have been more of a rejuvenation and clean-up type, rather than an enlarging program. The San Juan plant is rated at 2700 bbl. per day, and the Gold Hill at 2000. All West Coast plants operate wet.

The Redwood City plant secures its lime requirements from dredge operations in the bay adjacent to the plant. Finished cement is not shipped by water. The plant recently installed four Fuller coolers, which raised capacity of the operation 10 percent. About 80 percent of the plant's output is shipped by truck, the remainder by rail. Trucks haul 100 percent of the output at the San Juan plant. At Gold Hill, about 60 percent goes out by truck. All truck shipments are by contract with private haulers. To expedite truck shipments, the Redwood City plant added two new tanks for truck loading and improvements in truck-loading facilities were also made at the Gold Hill plant. Trucks are weighed after loading. The Redwood City plant is now rated at 2,700,000 bbl. per yr. The company maintains no distribution silos, all shipments being made direct from the plants.

**The Monolith Portland Cement Co.'s** plant at Monolith, near Tehachapi, has five kilns that are equipped to burn gas or oil. One of the 11-ft. dia. kilns has been made into what is essentially a kiln 600-ft. long, making it probably the longest in the world. This was accomplished by installing a length of kiln immediately above the older section. The combined lengths of the two units is nearly 600 ft.

Slurry is fed into the upper end of

the upper section, and the kiln is fired at the lower end of the lower section. A goose-neck at the low end of the upper section connects the two. Partially calcined material from the upper section does not pass through the goose-neck, only the gases and entrained dust. The rest of the material passes to the lower section by means of specially designed scoops. The lengthened kiln has a present capacity of 4500 to 5000 bbl. per day with a potential of 5600 bbl. per day. It was company-designed. Similar pre-calciners are on the other four kilns. The plant operates wet.

At the quarry, some three miles from the plant, a 13 ft. dia. by 11-ft. ball mill has been installed. It operates dry and receives a minus 3-in. feed from the Williams hammermill that is the final reduction unit. Before crusher-run is fed to the new mill, the minus 1/4-in. is screened out on a rod-deck screen. The mill has four tires of heavy railroad iron, two tires at each end. The tires ride on flanged railroad wheels and each of the bank of four trunnions has its own drive motor and reduction gear (four drive motors in all). It operates in open circuit and reduces the feed to practically all a minus 1/4-in. material. It is loaded with 3- and 5-in. steel balls. The limestone is then loaded into narrow-gauge railroad cars and delivered to the plant where it is fed to the raw grind mills.

The raw mills operate in closed-circuit with Hummer screens.

Some portions of the plant were damaged by the earthquake the area experienced a year ago, but has been repaired. Damage was confined to storage and other facilities. Actually, the plant was down only a few hours.

The Monolith Portland Cement Co. has been under the same management for 35 yrs.—probably a national record.

It was built in 1909 by the City of Los Angeles and taken over by the present company in 1919. The company has three distribution plants in southern California. Shipments to them are mostly by rail, although truck shipment is an important phase of the transportation system.

**The Northwestern Portland Cement Co.** is now rated at 600,000 bbl. per year. The plant, which is at Grotto on the western slope of the Cascade Mountains, uses the wet process. The quarry is on the eastern slopes. This operation (quarry) was described in *ROCK PRODUCTS*, September, 1955, p. 42. Approximately 75 percent of the plant's output at Grotto is hauled by truck, the remaining by rail. There are three company-owned bulk trucks and one flat rack in service. At the quarry, a 4-in. Joy rotary drill with a 600 c.f.m. compressor was recently placed in service. Through company innovations, the drill has been used for vertical, horizontal and angled holes (in the 15-deg. range), both up and down.

**The Olympic Portland Cement Co.'s** operation at Bellingham, Wash., is the most northerly of the chain of plants on the Pacific Coast. It has a nominal capacity of 1,000,000 bbl. per yr. and operates wet. Its contribution to the growth of the industry has been in improvements in its distribution system, with emphasis on water and bulk-truck transportation. About 83 percent of the production is bulk shipments in trucks, barges, and rail, and the 17 percent balance in paper bags. Trucks handled some 34 percent in bulk and flat racks during 1955, 26 percent by rail and 40 percent by water. Shipments to Alaska are an important part of the company's business.

Recently, the company built on the Seattle water-front a new distribution plant, and all shipments from it are by truck. Sacking is done at this plant. At Bellingham, a Fuller-Huron air-slide car-loading system loads one of four company-owned railroad carriers. These are hauled to the dock several thousand feet away, where the material is loaded to a 6500-bbl. capacity barge. It takes about 16 hr. to load the barge and 32 hr. to unload. The highway distance to Seattle is approximately 90 miles, and it takes 18 hr. to make the trip. The barge can make two round trips per week. Fuller-Kinyon pumps load and unload the barge.

Improvements are currently underway at the Bellingham plant to revamp the airslide car-and-truck loading system. This is designed to speed operations. Trucks and trailers are loaded and weighed on two separate

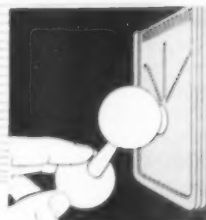
# Are you losing

# 10% of a day's production

# every time you change crusher setting?



**One-man,  
One-minute  
PRODUCT  
CONTROL**



● On some gyratory crushers, it takes 45 minutes and longer to change setting for different product size — in many instances, it takes hours. But even 45 minutes of downtime represents about 10% of your day. You don't have to put up with this lost production — not if you install the *Hydrocone* crusher, the crusher with one-man, one-minute product control.

With the *Hydrocone* crusher (and *only* with this modern crusher) you can change product size at the flick of a switch. Compensating for wear is accomplished just as easily. And if the *Hydrocone* crusher stops under load, just flick the switch and you're in business again.

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**Batching plant** set up by Service Rock Co., to supply concrete for Permanente Cement Co., plant at Cushenberry, Calif.

scales and again check-weighed on a long set of truck scales. The newer system, when completed, will be a push-button and fully automatic operation. Airslides are used at the Seattle distribution plant also. All truck shipments are by outside haulers.

**The Oregon Portland Cement Co.'s** construction program at its plants at both Oswego, Ore., and Lime, Ore., is progressing on schedule.

The new kiln at the Oswego plant started on April 9, 1956 and has been in operation continuously since that date. All auxiliary equipment comprised in this construction project is now in operation and is performing satisfactorily. This equipment includes, in addition to the new kiln, a rock car-unloader, new rock crusher, new raw and finish grind machinery, slurry basins, Cottrell building and electrical precipitator, new stack, new cement storage and a conveying and rock-loading system at the quarry operations at Dalles, Ore.

At the Lime, Ore. plant, satisfactory progress is being made in the installation of the new kiln and equipment. Excavations and foundations are well along, and it is anticipated this new unit will be in operation in 1956.

**The Permanente Cement Co. plant,** Permanente, Calif. near San Jose, recently added another kiln to its production line to bring the plant's yearly production to 8,400,000 bbl. It is the second largest plant in the world. The new kiln is 12 ft. in dia. and 448 ft. long, and is an F. L. Smidth & Co. unit. The plant operates wet. On the raw side, a 9-ft. 6-in. by 25-ft. Marcy ball mill has been installed, and on the finish side a similar unit with a third Marcy has been installed as a swing mill for either raw or finish grinding. The grinding section has been reshuffled, too, so that the new additions are 1500-hp. units; 500 hp. on the older preeliminators and 1000-hp. each on the new Marcys. Two additional Research Cottrell electrical precipitators are installed.

The company operates a fleet of 32 bulk-tandem units and four flats. A large percentage of the plant's output is shipped in bulk and by truck, railroad and water. Boat-loading facilities are being enlarged at Redwood City. Bulk trucks haul from Permanente to the Redwood City boat-loading, a distance of 18 miles. At the cement plant, truck-loading facilities have been enlarged so now there are a total of seven stations from which trucks can be

loaded. Five of these stations use a bulk-loading weigh-bin ahead of the trucks. These dump to truck and then to the trailer. All trucks are then check-weighed on a 60-ft. long platform scale. The bulk trucks use aluminum tanks which permit hauling a larger payload. The units have one dump hopper. This makes possible a still larger payload and makes for faster unloading than when two hoppers are used per tank. The number of tractors is evenly split between Peterbuilt and Kenworth.

Early this spring, the Permanente Cement Co. started construction of a new plant at Cushenberry. This is in southern California and in the Victorville-Lucerne Valley area and on the fringe of the Mojave desert. Construction of this plant marks another milestone in this company's development. The new plant will serve the Los Angeles, San Diego areas as well as practically all of southern California. The plant, which will have a capacity of 2,500,000 bbl. per year, will operate wet. It will cost an estimated \$13,000,000.

A large deposit of high-calcium limestone has been opened at Cushenberry and from it the Kaiser steel interests will secure its metallurgical stone for the Fontana furnaces. The crushing plant at Cushenberry will prepare two sizes of metallurgical stone; a ¾-in. to 3½-in. for blast furnace stone and a 3½-in. to 7-in. stone for the open hearth furnaces. The smaller rock will be for cement purposes, but the crushing facilities will be flexible enough to recrush as needed. The primary crusher will be a 66-in. x 84-in. Birdsboro-Buchanan jaw crusher with a Telsmith 20-in. gyratory as a secondary. Final reduction will be in a 15-50 Pennsylvania impactor that will operate in closed-circuit with Hewitt-Robins vibrating screens. A bar-deck scalper will follow the primary crusher. Ground-stored rock will be reclaimed by belts from tunnels. The tonnage of rock going to the steel mills will be about the same as the cement plant's requirements. The Santa Fe railroad is building a 32-mi. spur into the area to serve the company. It also will use 30 company-owned dual-bulk haulage trucks.

There will be two F. L. Smidth & Co. rotary kilns, gas-fired. The kilns are 12-ft. dia. and 448 ft. long. They will be equipped with 8- x 44-ft. Fuller coolers and two Research Cottrell electrical precipitators will handle the kiln dust. Buell dust collectors will be on the coolers.

For raw and finish grinding there will be three 9½- x 36-ft. three compartment mills, each powered by a

(Continued on page 220)



# Why brute loads don't "bust" this screen

● Here's a screen built to take abuse ... a screen specifically designed to handle large quantities of big, heavy rock and ore.

The main frame of this powerful PIONEER Mesabi Vibrating Screen is built from 18" car channel or I-beams and reinforced with 8" wide flange cross beams. Screen frames are constructed from extra-heavy channels, pipe, angles, and bars. Pan side thicknesses range from  $\frac{3}{8}$ " to  $\frac{1}{2}$ ", depending on size of screen. Angle bracing at critical points adds further strength and rigidity. Beefed-up shafts are built to take it.

**EFFICIENCY.** PIONEER Mesabi screens are not only rugged, but you just can't beat them for fast, accurate separation.

That's because PIONEER's full circle, forward throw agitation produces an identical, positive motion from one end of the pan to the other. Every inch of this screen works for you.

Near-perfect balance is maintained by placing the shaft at the pan's exact gravitational center and counterbalancing the flywheels to offset the throw of the pan. This gives precise static and dynamic balance at all times. Since vibration is confined to the pan and not transmitted to the frame, less power is needed and equipment lasts longer.

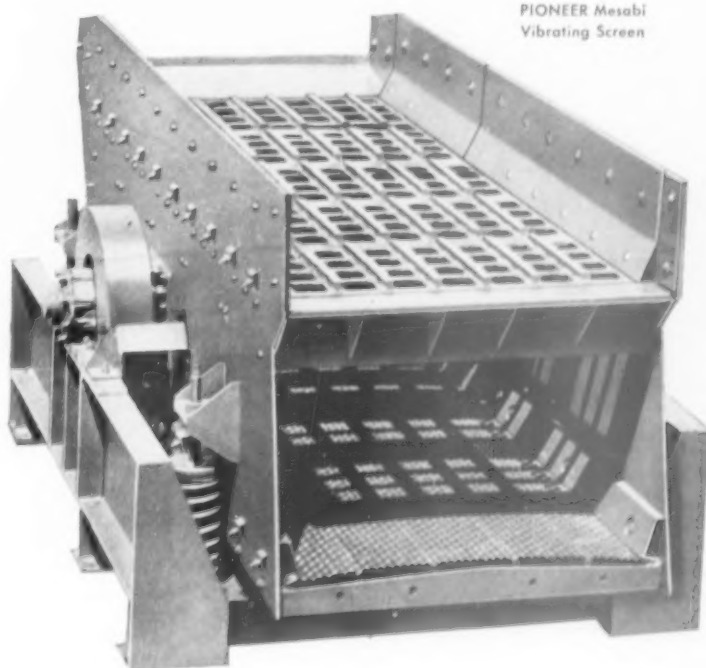
**OUTPUT.** PIONEER screens are known for their extra capacity. Positive throw, down-hill agitation, and use of the entire screen surface, combine to deliver maximum tonnage.

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4'x12'	15	10,000	10,000	9,100
5'x10'	20	11,800	11,800	11,000
5'x12'	20	12,800	12,700	12,000
5'x14'	25	13,700	13,600	13,000
6'x12'	30	14,550	14,200	13,800
6'x14'	30	15,800	15,300	14,900

## Ask your screen salesman these questions

1. Will frame resist sagging and twisting under heavy loads?
2. Is vibration effectively confined to pan?
3. Do both ends of screen vibrate equally with the middle?
4. How efficient, percentagewise, is separation?



PIONEER Mesabi Vibrating Screen

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# Control of the LIME BALANCE In Portland Cement Clinker

By L. A. DAHL\*

## SYNOPSIS

• • • Methods of determining departures of portland cement raw mixtures from the technical lime limit are described. These methods involve clinkering samples at a suitable time and temperature, and determining free lime content. For samples that are, or may be, below the technical lime limit, a known percentage of pure calcium carbonate is added before clinkering. Equations and nomograms are presented for calculating the lime excess or deficiency in the latter case. Control to secure a desired lime deficiency in the cement clinker may be direct, or it may be indirect through determinations of the carbonate content of the raw mix, depending upon plant facilities for raw mix control. The advantages are uniform burnability of the raw mix, efficient kiln operation and constant high quality of the product.

ONE OF THE FIRST OPERATIONS in the manufacture of portland cement is proportioning the raw materials to secure a satisfactory balance between the lime content and the percentages of other constituents. If the lime content is too high, the raw mix is hard to burn and the clinker may sometimes be unsound because of the presence of an undesirable percentage of free CaO. If the lime content is too low, the clinker may be hard to grind, and the early strength of the product may not be satisfactory. The lime content of the clinker should not exceed the "technical lime limit," which depends upon the percentages of other constituents. After discussing this lime limit, methods of determining departures from it will be presented, and application to control of the raw mix composition will be discussed.

In a recent paper<sup>1</sup> the author discussed the interpretation of the Rankin phase diagram of the system  $\text{CaO}-\text{Al}_2\text{O}_3-\text{SiO}_2$  with reference to the burning of portland cement raw mixtures. It is understood, of course, that portland cement clinker contains other oxides in addition to lime, alumina and silica. However, a study of the ternary system brings out some principles that can be applied in the manufacturing process to the problem of

proportioning raw materials to secure a satisfactory lime balance in cement clinker.

It was shown from the phase diagram that certain difficulties arise in burning mixtures of the three oxides when their compositions are on the high lime side of the line joining the  $\text{C}_2\text{S}$  point and the invariant point for  $\text{CaO}$ ,  $\text{C}_2\text{S}$  and  $\text{C}_3\text{A}$ . At the invariant point temperature, 1470 deg. C. (2678 deg. F.), and above that temperature, free lime is present at equilibrium, and is not removed by prolonged heating. With slow cooling, the free lime may be resorbed as the temperature drops below 1470 deg. C., but the cooling must take place much more slowly than could be considered practicable for a commercial operation. A study of the course of crystallization of liquids composed of the three oxides led Spohn<sup>2</sup> to view that the limiting lime content in the manufacture of cements is the line joining the  $\text{C}_2\text{S}$  point and the invariant point for  $\text{CaO}$ ,  $\text{C}_2\text{S}$  and  $\text{C}_3\text{A}$ , as mentioned above. This he termed the "technical lime limit," to distinguish it from the theoretical lime limit, which applies only to an ideal process in which cooling is so slow that at each temperature a state of equilibrium is attained before a further reduction in temperature takes place. The equation for the technical lime limit is:

$$\text{CaO}_{\text{max}} = 2.80 \text{ SiO}_2 + 1.18 \text{ Al}_2\text{O}_3 \quad (1)$$



Louis A. Dahl

Spohn demonstrated the technical lime limit by an interesting procedure. A series of mixtures of the three oxides was prepared with the ratio of silica to alumina ranging from 0.05 to 8.25, a much wider range than would be found in portland cement. The lime content in each mixture was above the technical lime limit. These mixtures were burned for one hour at 1460 deg. C. furnace temperature, in a stationary furnace. Exothermic reactions caused the charges themselves to attain higher temperatures. This is indicated by the fact that the appearance of the clinkers indicated the presence of melt in the considerably greater proportions to be expected at 1470 deg. C. as estimated from the phase diagram. After cooling the clinkers, free lime was determined by the alcohol-glycerol method, as revised by Lerch and Bogue.<sup>3</sup> For each clinker the free lime was deducted from the total lime, and the remaining composition calculated to a 100 percent basis. These compositions were then plotted on a triangular diagram of the system  $\text{CaO}-\text{Al}_2\text{O}_3-\text{SiO}_2$ . Those with  $\text{SiO}_2/\text{Al}_2\text{O}_3$  ratios from 0.23 to 8.25 were very close to the line joining the  $\text{C}_2\text{S}$  point and the 1470 deg. invariant point, thus demonstrating that this is the technical lime limit.

In 1934, Lea and Parker reported an investigation of a portion of the quaternary system  $\text{CaO}-\text{Al}_2\text{O}_3-\text{Fe}_2\text{O}_3-\text{SiO}_2$ , and followed this the next year with a study of the application of the data on this system to portland cement technology<sup>4</sup>. In that study the equation of the technical lime limit was extended to include the influence of  $\text{Fe}_2\text{O}_3$ , as follows:

$$\text{CaO}_{\text{max}} = 2.80 \text{ SiO}_2 + 1.18 \text{ Al}_2\text{O}_3 + 0.65 \text{ Fe}_2\text{O}_3 \quad (2)$$

This equation involves the four major

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components of portland cement clinker, but it does not take into account the minor components, such as  $MgO$ ,  $TiO_2$  and the alkalis. Progress in phase equilibrium investigations has not reached such a stage that these oxides can be included in a more complete equation for calculating the technical lime limit. It may also be noted that equation 2 is based upon considerations involving  $C_2AF$  as the  $Fe_2O_3$  compound in portland cement. More recently, it has been shown by Swayze<sup>7</sup> that the solid solution series formerly believed to extend from  $C_2F$  to  $C_2AF$  actually extends from  $C_2F$  through  $C_2AF$  to a compound  $C_2A_2F$ . This fact introduces some doubt as to the validity of equation 2 as an expression of the technical lime limit in mixtures of the four oxides.

#### Determination of Departures From Lime Limit

It appears from the foregoing that the present knowledge of phase equilibria involving the phases in portland cement does not provide a sound basis for mathematical expression of the technical lime limit in terms of the complete series of oxides in the commercial product. However, the study of the system  $CaO-Al_2O_3-SiO_2$  has brought out important facts concerning the reactions which occur in burning high lime mixtures, and the reasons for avoiding a lime content in the raw mix so high that the lime content of

the clinker is above the technical lime limit. All that is needed for application to control the lime balance in cement manufacture is a method of determining the degree to which the lime content of raw mixtures departs from the lime limit. Two methods, not requiring a knowledge of the oxide composition, are described.

#### Method 1 (for over-limed mixtures):

In the case of mixtures with a lime content above the technical lime limit, the method suggests itself. If such a mixture is burned long enough in a laboratory furnace at a temperature at which free lime exists in a state of equilibrium, the free lime present after fairly rapid cooling is the amount by which the lime content exceeds the technical lime limit. This corresponds to the method used by Spohn in demonstrating the technical lime limit. The temperature of 1470 deg. C. (2678 deg. F.) required in mixtures of lime, alumina and silica is not needed for a commercial raw mix, however, since melting temperatures are reduced by the presence of other oxides. For the quaternary system involving ferric oxide in addition to the three oxides, Swayze found the temperature at the invariant point at which  $CaO$  is an equilibrium phase to be 1342 deg. C., in close agreement with Lea and Parker<sup>8</sup>, and found that when magnesia is also present the corresponding temperature is 1305 deg. C

(2381 deg. F.). Hansen<sup>9</sup> found by means of heating curves that the temperature of liquid formation in four commercial clinkers varied from 1290 deg. to 1300 deg. C. (2354 deg. to 2372 deg. F.). From these data it appears that burns of commercial raw mixtures at about 1320 deg. C. (2394 deg. F.) for one hour should give results similar to those obtained by Spohn; that is, a free lime content corresponding to the lime excess. This may be taken as a starting point for trials to determine a suitable temperature and time for the furnace operation in dealing with the raw mixtures.

#### Method 2 (for both over-limed and under-limed mixtures):

In the case of under-limed raw mixtures in which it is uncertain whether they are over-limed or under-limed, the above procedure must be modified. A known weight of pure calcium carbonate is added to a weighed sample of the raw mix in sufficient quantity to insure that the resulting mixture is over-limed. After intimate mixing, the mixture is burned in a laboratory furnace as described, and the free lime content of the resulting clinker is determined. The lime excess or deficiency of the clinkered raw mix may be found by substitution in the following equation, which takes into account the ignition loss of the raw mix and of the calcium carbonate.

(Continued on page 158)

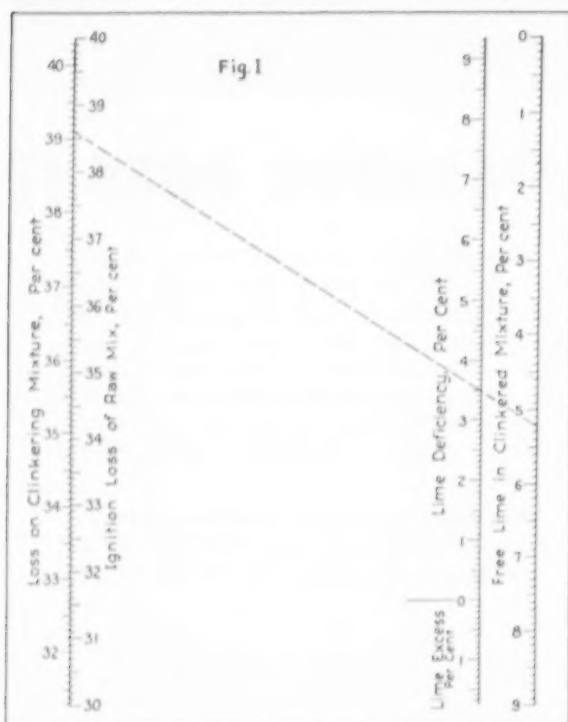


Fig. 1: Chart for estimating lime excess or deficiency; free lime in clinkered mixture less than 9 percent ( $r = 0.10$ )

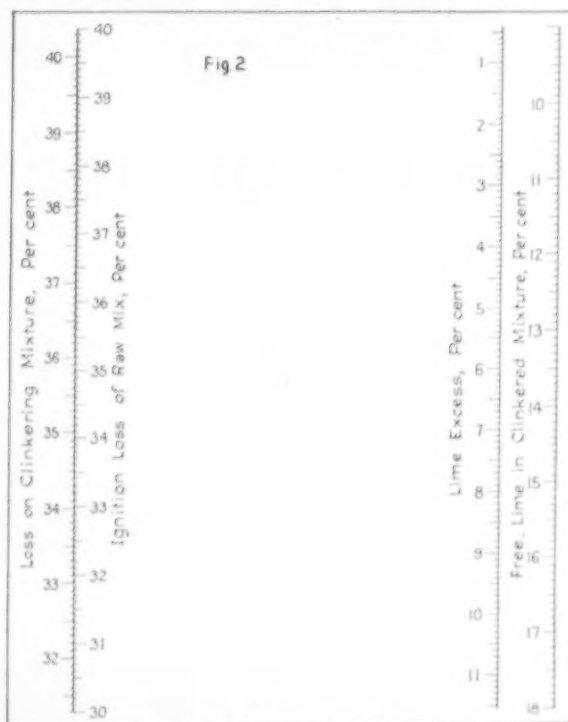
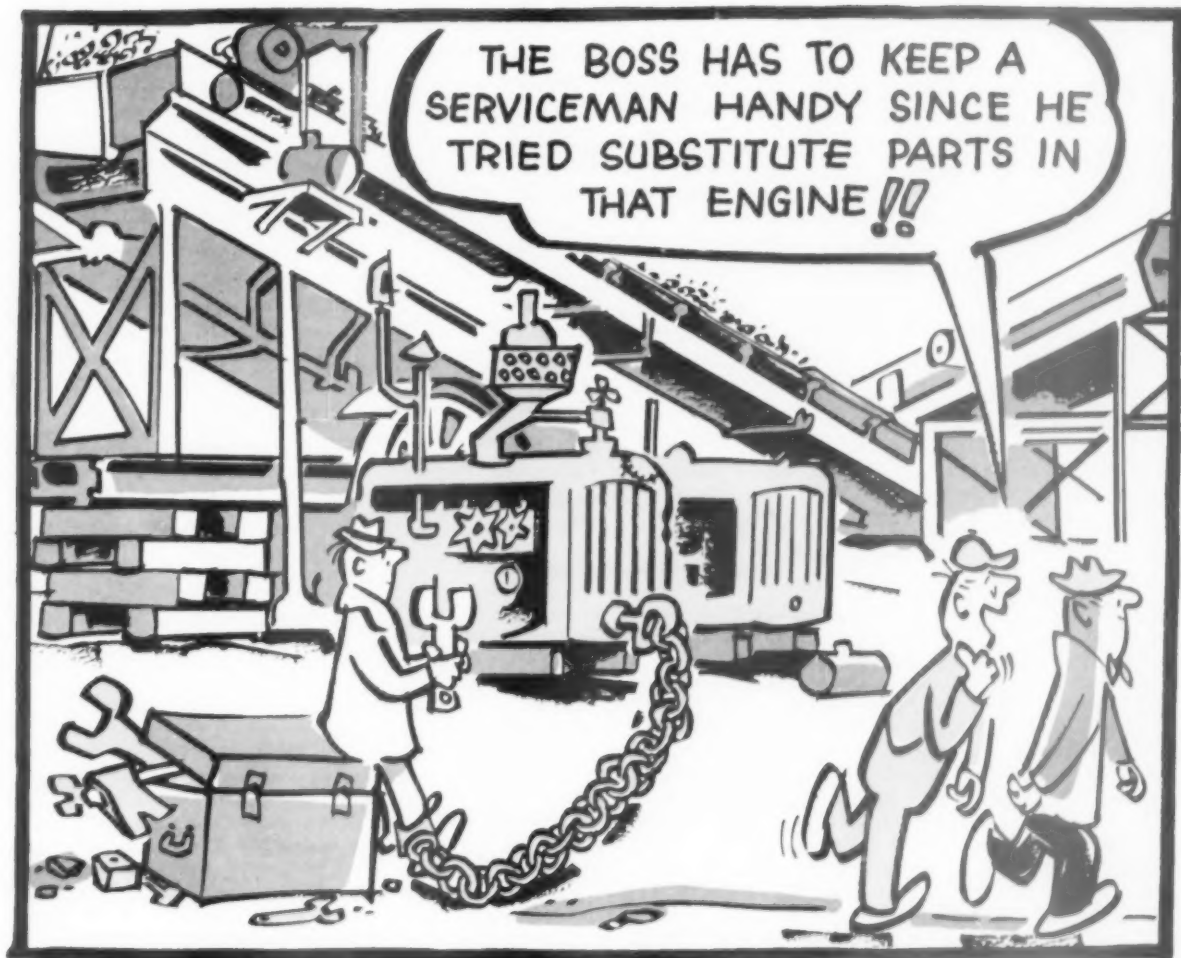


Fig. 2: Chart for estimating lime excess; free lime in clinkered mixture 9 percent to 18 percent ( $r = 0.10$ )





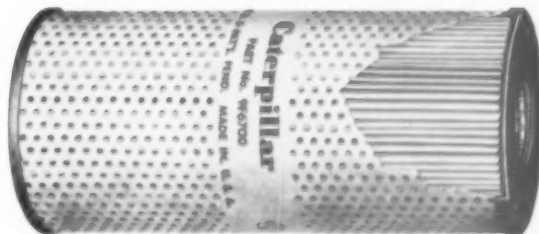
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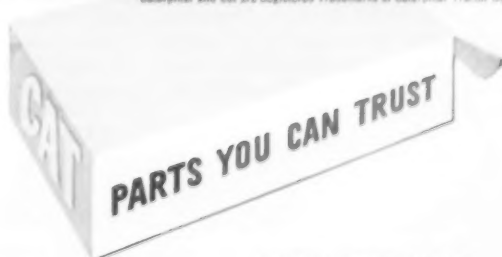
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$$d = \frac{56(100 - F)r}{100 - L} - F \quad (3)$$

in which  $d$  = CaO deficiency (or CaO excess if negative), percent of the clinkered initial raw mix

$r$  = added  $\text{CaCO}_3$ , grams per gram of initial raw mix

$L$  = ignition loss, percent of initial raw mix

$F$  = free CaO, percent of final clinkered mixture

The constant 56 is the CaO content of  $\text{CaCO}_3$ , or 100 less ignition loss.

**Example:** The ignition loss of a raw mix is 38.6 per cent, the weight of  $\text{CaCO}_3$  added is 0.10 grams per gram of raw mix, and the free CaO determined after burning the mixture is 5.2 percent. To find the lime excess or deficiency: Substituting in equation 3,

$$d = \frac{56 \times 94.8 \times 0.10}{61.4} - 5.2 =$$

8.65 — 5.2 = 3.45 percent, lime deficiency.

The problem also may be solved by the use of Fig. 1, which is a nomogram based upon the assumption that  $r = 0.10$ ; that is, that 0.10 grams of  $\text{CaCO}_3$  is added to each gram of raw mix. The example considered here is shown by the broken line in the figure. The straight line through points for 38.6 percent ignition loss and 5.2 percent free CaO intersects the intermediate line at 3.5 percent lime deficiency, which is close to the more accurate value above.

Equation 3 is precise, and can be applied to all raw mixtures, even those containing partially or completely calcined materials, such as blast furnace slag. At most plants the ignition loss,  $L$ , is between 30 and 40 percent. The following simpler equations are empirical, designed to give reasonably accurate results when applied within this range of values of ignition loss. Negative values indicate lime excess.

When

$$r = 0.05, d = 1.89 + 0.07L - 1.043F \quad (4a)$$

$$r = 0.10, d = 4.12 + 0.13L - 1.087F \quad (4b)$$

$$r = 0.15, d = 6.01 + 0.20L - 1.130F \quad (4c)$$

$$r = 0.20, d = 7.89 + 0.27L - 1.173F \quad (4d)$$

Applying equation 4b to the foregoing example, the lime deficiency is found to be 3.49 percent, which is in reasonable agreement with the result obtained with equation 3.

**Computations Based upon Clinkering Loss.** To apply equations 3 and 4a-d, a knowledge of the ignition loss of the raw mix is required. To make two separate furnace operations, (1)

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search chemist of the Portland Cement Association, and in 1940 was appointed manager of the Manufacturing Research Section. In October, 1944 he became a research associate for the P.C.A. at the National Bureau of Standards, but in 1949 he returned to the Association as senior research mathematician until his retirement in June, 1954. Mr. Dahl is well-known to ROCK PRODUCTS' readers as the author of a number of articles on phase equilibria and other subjects.

to determine the ignition loss of the raw mix, and (2) to clinker the mixture of raw mix and calcium carbonate, adds to the time and effort involved. However, if the mixture of raw mix and calcium carbonate is weighed before and after burning, to determine loss of weight on clinkering, the ignition loss of the raw mix can be estimated by applying the following equation:

$$L = (1 + r) L_c - 44r \quad (5)$$

in which  $L$  = ignition loss of raw mix (percent)

$L_c$  = percent loss on clinkering mixture of raw mix and calcium carbonate

$r$  = added  $\text{CaCO}_3$ , grams per gram of initial raw mix

When  $r = 0.10$ , the equation becomes

$$L = 1.10L_c - 4.4$$

This equation was used in evaluating points for "Loss on Clinkering Mixture of Raw Mix and Calcium Carbonate" in Figs. 1 and 2. In these figures the scale for ignition loss of the raw mix and for clinkering loss of mixture of raw mix and calcium carbonate are side by side along the vertical line at the left, and either one can be estimated directly from the other, provided that  $r = 0.10$ . The diagrams have been based on the assumption that 0.10 grams of calcium carbonate is added to each gram of raw mix, because it is believed that plants using Method 2 can generally proceed on that basis.

#### Reducing Time for Determination of Lime Excess or Deficiency:

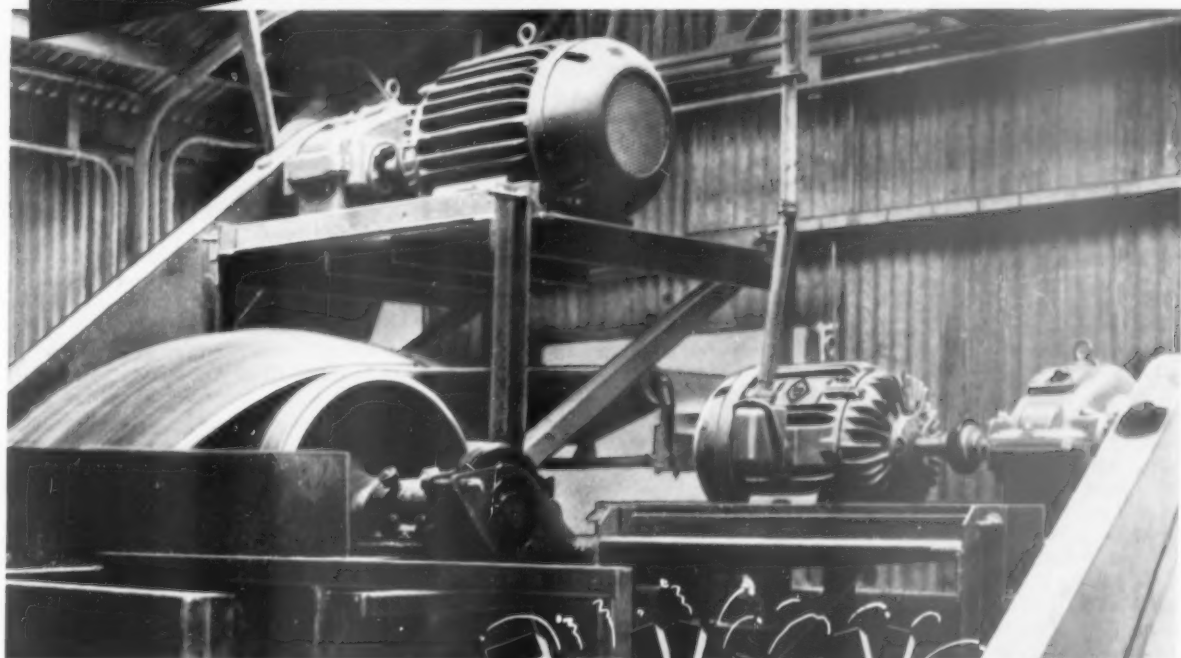
Trials may be needed to determine a suitable time and temperature for the furnace operation in determining lime excess or deficiency. After choosing the temperature, it will be advan-

tageous to choose a time somewhat less than that required to attain equilibrium. The error caused by this choice is a combination of a constant error and deviations from it. The constant error may be taken care of by aiming at a lower lime deficiency (or higher lime excess) in controlling the raw mix. Deviations from the constant error may be due to variations in burnability from causes other than composition as, for example, the presence of coarse siliceous particles in the raw mix. An error in the estimation of lime excess or deficiency from such a cause will lead to adjustment of proportions in the raw mix in the right direction to secure good burning. Thus, this procedure not only reduces the time required for determination of lime excess or deficiency, but also adds to its usefulness in its application to raw mix control.

High free lime values will be encountered frequently in the estimation of lime excess or deficiency. The alcohol-glycerol method for determining free lime is unsuitable, because the time required increases with the quantity of free lime present, and becomes excessive with the high percentages encountered. The ethylene glycol method of Schlöpfer and Bukowski<sup>9</sup> is satisfactory for high percentages of free lime. The method has been studied by MacPherson and Forbrich<sup>10</sup>, and a modification of the method described, requiring about 40 min. These investigators reported that none of the ethylene glycol they obtained was neutral, and it was necessary to neutralize it with calcium oxide. They describe the procedure in detail. It is possible that further improvement could be made by distilling after neutralization, discarding the portion of

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the distillate obtained below the boiling point of ethylene glycol (197.5 deg. C).

#### Application to Typical Manufacturing Processes

**The Lime Deficiency of Cement Clinker:** The purpose in control of the lime excess or deficiency in raw mixtures is to maintain a condition in which the lime content of the mixture undergoing clinkering in the hot zone of the kiln does not at any time exceed the technical lime limit. That is, the clinker always should be lime deficient, so that the output is maintained at a high level, and the production of unsound cement is avoided. The percent lime deficiency to be maintained is dependent upon various considerations. The type of cement being produced has an important bearing upon the lime deficiency to be sought. For high-early-strength cement (Type 3), the lime content sought will be as high as possible, but not exceeding the technical lime limit; that is, the lime deficiency should be low. On the other hand, production of low heat cement (Type 4) calls for a high lime deficiency. This may be illustrated in the cements used in the Long-Time Study of Cement Performance in Concrete<sup>11</sup>. Although it has been mentioned earlier that equation 2 does not express the technical lime limit as precisely as may be desired, it may be used in illustrating the relation of the type of cement to the lime deficiency. As calculated by this equation, the average lime deficiency of the thirteen Type 1 and 2 cements is 7.4 percent; of the three Type 3 cements, 2.8 percent; and of the four Type 4 cements, 16.0 percent. The facilities for control of raw mix composition may have an influence. If facilities for control are poor, the lime deficiency sought must be higher to avoid exceeding the lime limit.

Method 2 for determination of lime excess or deficiency of raw mixtures also may be applied to cement clinker. Ignition loss of the clinker is negligible, and therefore is assumed to be zero in deriving the following equation from equation 3.

$$d = 0.56(100 - F)r - F \quad (6)$$

in which the symbols have their former significance, except that  $r$  is now grams of added  $\text{CaCO}_3$  per gram of initial clinker.

Studies to determine the lime limit have been based upon research involving treatment in a stationary furnace, so that there is no appreciable gain or loss of material under heat treatment. This is the ideal condition for such investigations, but it does not simulate the manufacturing process. In burning portland cement raw mixtures in a rotary kiln with coal as fuel,

coal ash is collected between the feed end and the burning zone of the kiln and becomes part of the mixture which is burned to clinker. The draft in the kiln picks up finely powdered material in the kiln, to be discharged into the stacks, thus introducing further changes in composition. As a result of these conditions, composition of the ignited raw mix differs from the composition of the clinker. The lime deficiency of the raw mix is usually less than that of the clinker, especially if the fuel is coal, and may be so much less that it is negative; that is, that an excess of lime is present.

In controlling the lime balance under such conditions, a lime excess must be maintained in the raw mix. The particular lime excess to be sought must be constant until there is a change in the quality of the coal, particularly as to ash content. It is important also to establish a uniform procedure in the return of stack dust to the kilns. If facilities for control of proportions of raw materials are such that the lime content can be maintained continuously above the technical lime limit, Method 1 for determination of lime excess may be used. This saves much time, since the addition of calcium carbonate is unnecessary under these conditions, and the computations in Method 2 are eliminated.

**Carbonate Content and Carbonate Requirement:** The lime balance can be maintained in a direct manner by frequent determinations of the lime excess or deficiency of the raw mix. However, it may be preferred to proceed indirectly, by making use of determinations of carbonates in the raw mix as in the usual control methods, with only occasional determinations of lime excess or deficiency, the latter to be used as a guide in choosing the carbonate content to be sought. The total carbonate content of a raw mix can be determined rapidly by the acid-alkali method or by the calcimeter. These methods of determining carbonate content have played an important part in the routine control of relative proportions of calcareous and argillaceous materials in the raw mix. There is no virtue in maintaining the same carbonate content in the raw mix day after day, or shift after shift, since the raw materials used in cement manufacture are not pure substances, but vary in composition as they are won from quarry or pit. As a result, the carbonate content which is suitable on one day may be too high on the next day, leading to a mix which is difficult to burn properly. The carbonate content which the plant chemist seeks to obtain during any given period may be referred to as the *holding point*, a term used in some cement plants. The

TABLE 1—FACTORS FOR CONVERSION OF RELATIVE DRY WEIGHTS TO RELATIVE VOLUMES OF SLURRY\*

Per-cent moisture	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
30	1.03	1.03	1.03	1.03	1.04	1.04	1.04	1.04	1.05	1.05
31	1.05	1.05	1.06	1.06	1.06	1.06	1.07	1.07	1.07	1.08
32	1.08	1.08	1.08	1.09	1.09	1.09	1.10	1.10	1.10	1.10
33	1.11	1.11	1.11	1.12	1.12	1.12	1.12	1.13	1.13	1.13
34	1.14	1.14	1.14	1.14	1.15	1.15	1.15	1.16	1.16	1.16
35	1.16	1.17	1.17	1.17	1.18	1.18	1.18	1.19	1.19	1.19
36	1.20	1.20	1.20	1.20	1.21	1.21	1.21	1.22	1.22	1.22
37	1.23	1.23	1.23	1.24	1.24	1.24	1.25	1.25	1.25	1.26
38	1.26	1.26	1.27	1.27	1.27	1.28	1.28	1.28	1.29	1.29
39	1.29	1.30	1.30	1.30	1.31	1.31	1.31	1.32	1.32	1.32
40	1.33	1.33	1.34	1.34	1.34	1.35	1.35	1.35	1.36	1.36
41	1.36	1.37	1.37	1.37	1.38	1.38	1.39	1.39	1.39	1.40
42	1.40	1.40	1.41	1.41	1.42	1.42	1.42	1.43	1.43	1.44
43	1.44	1.44	1.45	1.45	1.46	1.46	1.46	1.47	1.47	1.48
44	1.48	1.48	1.49	1.49	1.50	1.50	1.50	1.51	1.51	1.52
45	1.52	1.52	1.53	1.53	1.54	1.54	1.55	1.55	1.55	1.56
46	1.56	1.57	1.57	1.58	1.58	1.59	1.59	1.59	1.60	1.60
47	1.61	1.61	1.62	1.62	1.63	1.63	1.64	1.64	1.64	1.65
48	1.65	1.66	1.66	1.67	1.67	1.68	1.68	1.69	1.69	1.70
49	1.70	1.71	1.71	1.72	1.72	1.73	1.73	1.74	1.74	1.75

\*The specific gravity of the dried slurry is assumed to be 2.65, and the slurry is assumed to contain no entrained air. Since the specific gravity of individual dried slurries may depart from 2.65, and entrained air is usually present in slurry in variable amounts, the factors in the table must be considered as approximate values and are therefore expressed only to two decimal places.

The table is based upon the equation,

$$\text{Factor} = \frac{k[100 + (d-1)w]}{d(100 - w)}$$

in which  $d$  = specific gravity of dried slurry  
 $w$  = percent moisture  
 $k$  = arbitrary constant

Assuming  $d = 2.65$ , and selecting 1.272 as a value of  $k$  which will make the factor for 30 percent moisture slightly greater than 1.00, the equation reduces to the form,

$$\text{Factor} = \frac{48 + 0.792w}{100 - w}$$

Table 1—A reproduction of Table 3 in Portland Cement Association Research Bulletin 17



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carbonate content which should be sought to secure a satisfactory lime balance may be referred to as the *carbonate requirement*. When a carbonate requirement has been determined, that carbonate requirement becomes the proper holding point for rapid carbonate determinations, until a new carbonate requirement has been determined. In a previous paper<sup>12</sup> it was shown by the writer that by means of complete analyses and rapid carbonate determinations of occasional samples of raw mix, perhaps once a day or once per shift, it is possible to calculate the carbonate requirement for a desired potential  $C_2S$  or  $C_3S$  in the raw mix. These occasional determinations of the carbonate requirement serve to guide the selection of holding points for the more frequent carbonate determinations in routine control.

In controlling the lime excess or deficiency of the raw mix, rapid carbonate determinations may be used in the same manner as in control of potential  $C_2S$  or  $C_3S$ . An occasional sample of the raw mix is divided into two parts, one for determination of total carbonates by the rapid control method, the other for determination of lime excess or deficiency. The carbonate requirement may be calculated by substituting the two test values in the following approximate equation\*:

$$P = p + 0.23(d - D) \quad (7a)$$

in which  $P$  = carbonate requirement, as  $CaCO_3$ , percent of raw mix

$p$  = percent carbonates found, percent of raw mix

$d$  = percent lime deficiency found, as previously defined

$D$  = desired lime deficiency.

If expression in terms of lime excess is preferred,

$$P = p + 0.23(E - e) \quad (7b)$$

in which  $E$  = the desired lime excess

$e$  = percent lime excess found.

Occasional determinations of the carbonate requirement will guide the selection of holding points for the more frequent carbonate determinations in routine raw mix control. Thus, the use of rapid carbonate determinations in a procedure which is intended to maintain a constant lime excess or deficiency gives an advantage in saving time similar to that obtained when applied to control of potential compound composition. There is an important difference, however. The lime excess or deficiency of a raw mix can be determined in less time than is

needed for the chemical analyses which supply the data for calculation of potential compound composition. As experience is gained in the determination of lime excess or deficiency, the time is reduced still further. The question may finally arise whether one should continue the carbonate determinations, or replace them with suitably frequent determinations of lime excess or deficiency. If the raw materials should change in composition abruptly between determinations of the carbonate requirement, the holding point for carbonate content may be in error. This is avoided when the lime excess or deficiency is determined and applied directly.

The experience of Spohn<sup>12</sup> in applying the method in a dry process cement plant in Germany is of considerable interest. Short swing variations in composition were smoothed out by a blending system consisting of 12 silos operated in such a manner as to secure a maximum blending effect. Routine control was based on the carbonate content, determined by a calcimeter test. In each shift the carbonate requirement was determined by testing a raw mix sample by the calcimeter test and by a determination of the lime excess or deficiency; this carbonate requirement was then the holding point for carbonates in the following shift. It was found that a lime excess was required to compensate for coal ash. This excess proved sufficient to take care of control needs at this plant. It was therefore possible to discontinue the addition of calcium carbonate before the burning operation in the determination of lime excess or deficiency. This reduced the time of preparation of samples for burning. The burning period for samples was reduced to 30 min., and the time for free lime determinations to 20 min. As a result of these reductions in the time required for determinations of lime excess, the lime excess so determined was applied directly in the adjustment of the proportioning scales for limestone and shale. The calcimeter was never used again after that time.

#### The Two-Stage Proportioning Process:

In the two-stage process the first stage is a continuous proportioning process discharging slurry into tanks for proportioning in batches in a second stage. The first proportioning operation need not be precise, but the second operation can be simplified and made more effective if the first operation is not too crude. Tests of the carbonate content of the mix, to meet holding points selected by occasional determinations of the carbonate requirement, may be used to control the

lime balance in both stages, or combinations of tanks of slurry in the second stage may be based upon actual determinations of lime excess or deficiency in each tank. The procedure may be described by means of numerical examples. It will be assumed in these examples that a preliminary investigation at the plant has indicated that a lime excess of 3.2 percent in the raw mix will result in a desired lime deficiency in the clinker. This is consequently the aim in controlling the lime balance.

To determine the carbonate requirement, a sample of the raw mix is divided into two parts, one for the rapid control method for carbonate content, the other for determination of lime excess or deficiency by Method 2. We will suppose that the carbonate content is found to be 77.0 percent. In determining lime excess or deficiency, 10 percent by weight of calcium carbonate is mixed with the dry raw mix before burning. The loss on clinkering the mixture is 37.8 percent, and the free  $CaO$  is 4.4 percent. Applying Fig. 1, the lime deficiency of the raw mix is found to be 4.2 percent, or a lime excess of -4.2 percent. Substituting  $p = 77.0$ ,  $E = 3.2$ , and  $e = -4.2$  percent in the equation 7b, the carbonate requirement  $P$  is found as follows:

$$P = 77.0 + 0.23(3.2 + 4.2) = 78.7 \text{ percent}$$

Until there is a significant change in the composition of the raw materials, maintaining the holding point for carbonates at 78.7 percent is equivalent to maintaining the desired lime excess, 3.2 percent.

For the present it will be assumed that routine control in both stages is based upon carbonate determinations. Let us suppose that the test values for two tanks of slurry are as follows:

	Tank A	Tank B
Total carbonates	79.62	75.94
Moisture	35.3	41.9

The relative quantities of slurries (dry basis) to be combined to obtain a slurry with 78.7 percent carbonates may be found by the use of a "box diagram," as shown below:

	Carbonates	Rel. wt. Dry basis
Slurry A	79.62	2.76
Slurry B	75.94	0.92

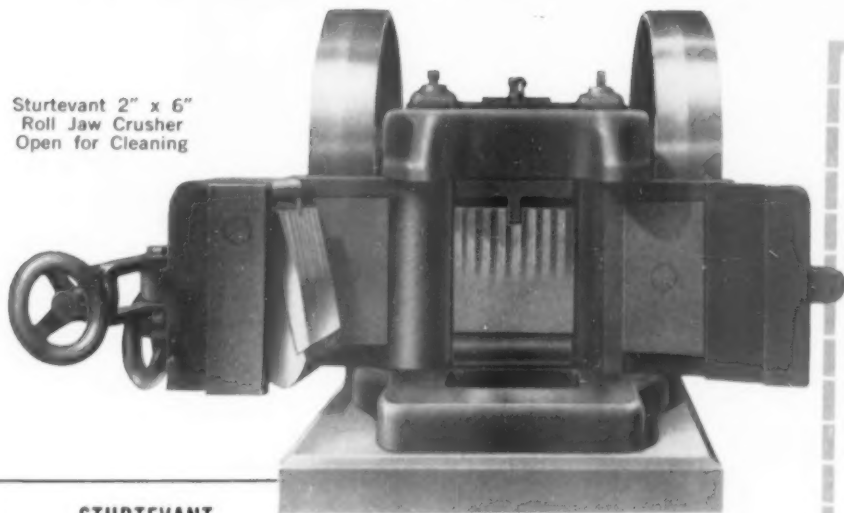
The desired carbonate content is placed in the rectangle, and subtractions are performed diagonally. This places the results on the same lines as the slurries to which they apply. It is found that, on a dry basis, 2.76 parts by weight of the raw mix in tank A

(Continued on page 166)

\*This equation was presented by the writer in 1936 in an unpublished Portland Cement Association research report, which is reviewed by R. H. Bogue in "The Chemistry of Portland Cement," first edition, pages 176-179 (1947); second edition, pages 235-238 (1955).

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## LONE STAR EXPANDS

(Continued from page 146)

machines. All shipments are via rail, the plant being served by the Union Pacific and the Kansas City Kaw Valley and Western railroads. The latter connects to several lines in the Kansas City Terminal. In 1955, 79 percent of the shipments were bulk, 21 percent bag.

An outstanding feature of the Bonner Springs operation is its safety record, which places the plant among the leaders in the cement industry. On March 27, 1956, it marked the 2000th day without a lost-time accident; this is believed to be the longest current record in the industry.

The safety program includes monthly safety meetings and inspections, extensive use of safety posters, and participation in regional P.C.A. safety meetings. Each month one department is in charge of the plant safety meeting, and two men from the department are appointed to inspect the entire plant. In addition, the plant issues a 2-page safety bulletin each month—in competition with all other Lone Star plants. The company slogan is "An accident free year is our goal here."

Initial designing of the plant ad-

ditions was under the direction of George Winther, assistant chief engineer at the Lone Star engineering department in New York, New York. MacDonald Engineering Co. did the detail engineering and was the general

contractor for all new construction. The kiln was erected on subcontract by Erectors and Riggers Inc., Houston, Tex. Slurry piping was by Nattin & Co., Kansas City, Mo., and electrical work by Crescent Electric Co.


Principal officers of the Lone Star Kansas Division are M. H. Small, vice-president and manager, M. R. Whittlesey, treasurer, and C. U. Brownlee, divisional sales manager. V. J. Van Reekum is general superintendent of the Kansas, Indiana, and New York plants. Key personnel at Bonner Springs are John B. Lape, Jr., superintendent; J. H. Griffith, chief chemist; L. K. Schlumbrecht, assistant superintendent; E. R. Willis, general mill foreman; and Clarence Gruber, quarry foreman.



## Rapid Determination SrO & Mn<sub>2</sub>O<sub>3</sub>

NATIONAL BUREAU OF STANDARDS, Washington, D.C., has developed methods for the flame-photometric determination of strontium and manganese in cements (Technical Report 1968).

Previously issued reports of the same program include titania (RP 49, 103, April, 1946), Na<sub>2</sub>O and K<sub>2</sub>O (43, 173, 1949, RP 2019) and sodium (Anal. Chem. 25, 1825, 1953).



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ROCK PRODUCTS, August, 1956

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165

## CONTROL LIME BALANCE

(Continued from page 162)

and 0.92 parts by weight of the raw mix in tank B will make a mixture with a carbonate content of 78.7 percent. The relative volumes of slurry may be found by multiplying each relative weight by a factor obtained from Table 1, as follows:

	Rel. wt. dry basis	Factor (Table 1)	Rel. vol.
--	-----------------------	---------------------	--------------

Slurry A  $2.76 \times 1.17 = 3.23$

Slurry B  $0.92 \times 1.40 = 1.29$

Now let us assume that the tanks are of the same diameter, and that 30 ft. of slurry are available in each. Since slurry A is used in the greater quantity, the number of feet of slurry to be drawn from each is found by multiplying by  $30.0/3.23$ , or 9.29. That is,

	Rel. vol.
--	--------------

Slurry A  $3.23 \times 9.29 = 30.0$  ft.

Slurry B  $1.29 \times 9.29 = 12.0$  ft.

Drawn in these proportions, tank A is emptied and available for further operations.

In Table 1 it is assumed that the specific gravity of the dry raw mix is 2.65, which is an estimate not necessarily fitting every case. Furthermore, it does not take into account the presence of entrained air in the slurry. However, the factors give sufficiently accurate results if the slurries to be combined are not too far removed from the desired carbonate content. If they differ too much from the desired value the carbonate content should be checked after mixing. One of the advantages of fairly good control in the first stage is that there are fewer occasions for further tests and corrections following proportioning in the second stage.

### Direct Control of the Lime Balance:

When it is possible to determine the lime excess or deficiency of the slurry in each tank before release, the proportions in which combinations are made can be calculated from departures from the technical lime limit. Control of the lime balance is then positive, not disturbed by variations in composition of the raw materials, such as the silica ratio of shale or the percentages of magnesia or organic matter in the limestone. The computations of proportions is similar to that described for adjustment of carbonate content, but involves an extra step at the beginning of the computations, since lime excess or deficiency is ex-

pressed on an ignited basis. Let us assume again that the desired lime excess in the raw mix is 3.2 percent, and that the following test data are obtained:

	Tank A	Tank B
	Percent	Percent
Lime excess	7.3	-8.9
Ignition loss*	38.1	36.8
Moisture	35.3	41.9

The relative weights of the two raw mixtures, on an ignited weight basis, are obtained by the use of the box diagram, as follows:

	Lime excess	Rel. wt. ign. basis
Slurry A	7.3	12.1
Slurry B	-8.9	4.1
	3.2	

The relative weights on a dry (unignited) basis are obtained by dividing each relative weight, ignited basis, by  $(100-L)/100$ , as shown below:

	Rel. wt. ign. basis	100-L	Rel. wt. dry basis
--	------------------------	-------	-----------------------

Slurry A  $12.1 \div 0.619 = 19.55$

Slurry B  $4.1 \div 0.632 = 6.49$

Conversion of relative weights, dry basis, to relative volumes and feet of slurry proceeds in the same manner as in the previous example.

	Rel. wt. dry basis	Factor Table 1
Slurry A	19.55	$\times 1.17 =$
Slurry B	6.49	$\times 1.40 =$

\* \* \* \* \*

Effective control of the lime deficiency of cement clinker eliminates the danger of producing unsound cement. Variations in burnability are avoided, so that conditions are favorable for efficient kiln operation, with maximum output and fuel economy. The combination of uniform burnability and the resulting uniformity in the heat treatment applied to the clinker leads to constant high quality in the product.

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## Plans Third Cement Plant

PERMANENTE CEMENT CO., Oakland, Calif., will begin engineering immediately for a cement plant at Scholle, N. M., 55 miles southeast of Albuquerque, according to Henry J. Kaiser, president and chairman. This will be the first cement plant in New

	Rel. vol.
22.87	$\times 1.312 = 30.0$ ft.
9.09	$\times 1.312 = 11.9$ ft.

Mexico and the third to be operated by Permanente. An annual capacity of 1,400,000 bbl. of cement is anticipated. The new plant will increase Permanente's cement capacity to 12, 400,000 bbl. annually. Equipment will include a 12-x 450-ft. rotary kiln.

## Silos Sold

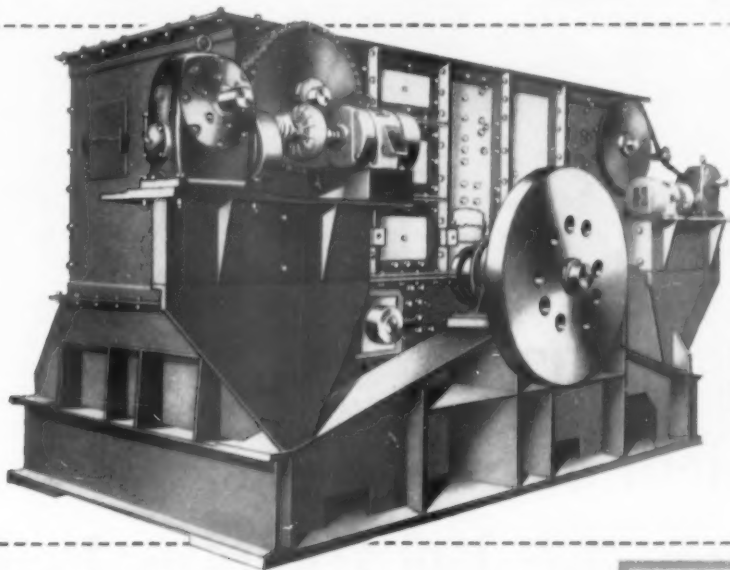
PENN-DIXIE CEMENT CORP., New York, N.Y., has assumed ownership of silos and property in Holland, Mich., from Medusa Portland Cement Co., Cleveland, Ohio. Plans call for enlargement of dock facilities and changes to the silos. Cement will be received by rail; ship deliveries will resume next year.

ELDEAN GRAVEL CO., Troy, Ohio, has been incorporated to operate the Estey Sand and Gravel Co. plant at Troy. Incorporators are Anthony, Eileen and Clarence Ernst of the Ernst Gravel Co., Piqua, Ohio. The plant reopened in July with Anthony Ernst as manager. The city of Springfield, Ohio, purchased the Springfield plant of the Estey Sand and Gravel Co.

\*Ignition loss of the raw mix may not have been determined directly, but calculated from the loss on clinkering the mixture of raw mix and calcium carbonate, applying equation 5 or Fig. 1.

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ROCK PRODUCTS, August, 1956

167

SAVINGS START



Quarry scene, showing three-unit portable plants in operation. Plant in foreground produces concrete aggregate; the other two produce base material. Three churn drills can be seen to the right

# PORTABLE UNITS

## Solve Problem of Supplying Crushed Stone for Big Highway Project

A NEW LIMESTONE QUARRY OPERATION of B. L. Anderson Inc. near Lawrence, Kansas, represents an outstanding example of the application of commercial portable plants in supplying aggregates for large highway construction projects. It is also one of the largest of its kind ever set up at a quarry site, incorporating three 3-unit portable crushing-screening plants, as well as washing and blending units.

Serving a 16-mile section of the Kansas Turnpike centered at Lawrence, the Anderson plant is supplying 700,000 tons of material, including 180,000 tons of concrete aggregate, 260,000 tons of sub-base material, and 260,000 tons of shoulder base material. Production was started in March, 1956, and the contract is to be completed in September. To meet this early fall deadline, the company is running the multiple plants two 9-hour shifts daily, six days per week. Daily output amounts to 2500 tons of washed 1- x 1/4-in. concrete aggregate and 3500 tons of unwashed 1 1/2- x 3/4-in. base course material.

The quarry, located 3 miles north of Lawrence along U. S. Highway 24, is situated at the crest of a prominent

### KANSAS TURNPIKE

... contract of B. L. Anderson, Inc., involves production of 2500 t.p.d. of concrete aggregates and 3500 t.p.d. of base course material. Facilities include three-unit crushing and screening plants, a washing and screening plant and a blending unit

By KENNETH A. GUTSCHICK

200-ft. escarpment; it is developed in the Oread limestone formation (Upper Pennsylvanian age) and has a 20-ft. face. Two of the 3-unit portable plants mounted on the quarry floor are used in the preliminary preparation of concrete aggregate, this material later being washed and rescreened. The third portable plant produces shoulder base material, which is either stockpiled directly for shipment, or blended with fine sand to produce sub-base material. Both the washing and blending plants are set up at the base of the ridge, feed to each plant being delivered by trucks over a 1/4-mile haul. All of the portable plant equipment was supplied by Iowa Manufacturing Co.

The following table gives the Kansas Turnpike specifications for the three sizes being produced by the Anderson Co. (figures are percent passing).

	Shoulder Base*	Sub Base**	Concrete Aggregate
1 1/2 in.	100	100	100
1	—	—	90-100
3/4	60-100	60-100	35-70
3/8	35-85	35-85	7-30
No. 4	28-73	28-73	—
8	—	—	0.5
10	20-57	20-57	—
40	10-30	10-30	—
200	7-15	0-5	—
Plasticity Index	<5	<5	—
Shale	—	—	<0.5 percent
Rotten Stone	—	—	<2.5 percent

\*Base material for asphaltic concrete shoulders  
 \*\*Sub-base material for portland cement concrete pavement

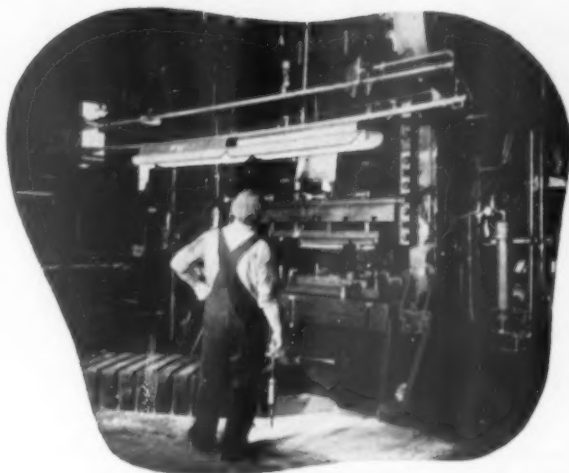
(Continued on page 170)



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**Washing plant** for concrete aggregate production. Portable conveyor in foreground issues from stockpile. Primary plant splits load three ways with log washer and spiral screw products rejoining for final washing and sizing

**Stripping at the Lawrence quarry** is carried out in two phases. First the top 15 ft. of soil and glacial till is removed by a pair of Caterpillar D8 tractor-10-cu. yd. scraper teams, and the underlying 5-10 ft. of shale and caprock is removed by shovel and truck following blasting. Primary drilling in the 20-ft. face is handled by three gasoline-driven Bucyrus-Erie 22T well drills putting down 6-in. holes in a 10- x 15-ft. pattern. DuPont explosives are used in blasting, a typical hole charge consisting of one Nitramix cartridge at the base, then three cans of Nitramon, one 4- x 24-in. primer, and 9 ft. of stemming. Detonation is by means of Primacord and Nos. O-6 millisecond delay caps. Generally three or four rows (30-60 holes) are shot at a time, with the yield being 2 tons per pound of explosive. The delays are arranged to give sequence firing, as illustrated in the following diagram. Through use of descending caps towards the center of the shot,

the central sector is pushed out the farthest, thus resulting in a roughly semicircular muck pile. This in turn permits the primary crushers to be moved close to the face at the sides of each shot area.

Quarry loading to each of the three primary crushing units is handled by two  $\frac{3}{4}$ -cu. yd. diesel shovels. In addition, there are two other  $\frac{3}{4}$ -cu. yd. shovels in service—one as a spare and the other on stripping. These include Bucyrus-Erie 22B and Lima Paymaster units—each powered by a GMC 371 diesel engine. The shovels also are used occasionally on secondary breakage, the drop ball being suspended from the bucket, with a rubber tire absorbing the shock.

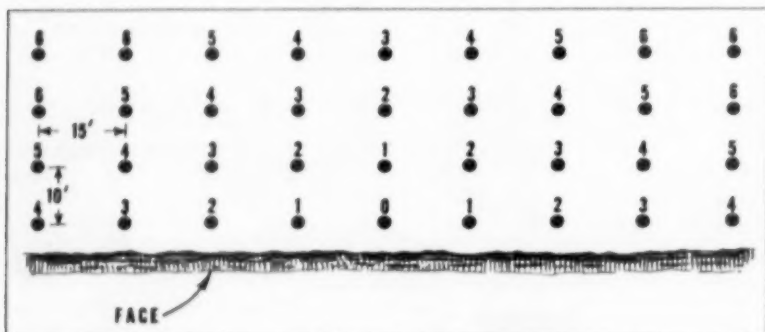
**For the production of base course material**, the company uses a Cedarapids 3645 double-impeller impact-breaker plant, a 4033 hammermill plant, and a screening plant, in series. The first unit incorporates a 4- x 14-ft.



**L. V. "Bill" Porter**, superintendent, left, and **B. L. Anderson**, owner

apron feeder, the impact breaker driven at 500 r.p.m. by two GMC 110 diesel engines, and a 36-in. belt conveyor discharging to the secondary crushing plant. The latter includes a hopper with plate feeder, and 30-in. conveyor feeding a 4- x 14-ft. double-deck screen, which is operated in closed-circuit with a 4033 hammermill. Product from the latter returns to the feeder conveyor by means of an undercrusher conveyor and elevating wheel. The hammermill is the two-spinner type, and is driven at 750 r.p.m. by a truck-mounted twin G.M.C. 671. The screen, driven by a G.M.C. 371, has decks with  $2\frac{1}{2}$ - and  $1\frac{1}{2}$ -in. openings, respectively. Oversize stone is recrushed, and minus  $1\frac{1}{2}$ -in. material is carried by 30-in. conveyor to the third portable unit. This plant has a 30-in. feed conveyor, a 4- x 12-ft. double-deck screen, and a G.M.C. 471 engine drive. The top deck, with  $\frac{3}{4}$ - and  $\frac{1}{2}$ -in. openings, serves as a relieving deck for the bottom deck, which has  $\frac{1}{2}$ - x  $\frac{1}{8}$ -in. slotted openings. Bottom deck throughs—predominantly clay and shale particles—are wasted, the  $1\frac{1}{2}$ - x  $\frac{1}{8}$ -in. material being the finished product. Each product is fed by conveyor to a portable 5-cu. yd. truck loader. Average base course production (of finished product) is 250 t.p.h., with about 20 percent of the plant feed being waste.

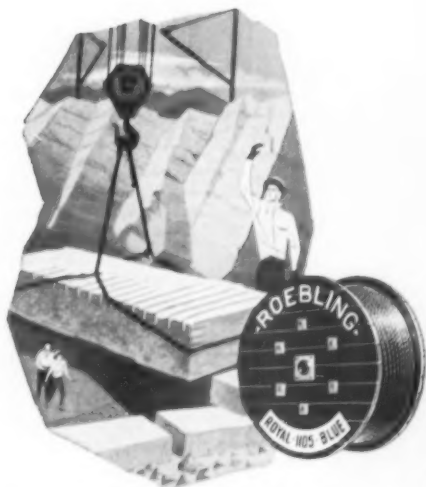
The two other 3-unit portable plants, which are used in producing concrete aggregate, are only slightly different from the road base plant. The primary crushers are 2036 jaw units, fed by 4- x 12-ft. apron feeders, and are driven by Caterpillar D318 or D8800



**Diagram showing sequence firing pattern** for multiple row blasts, with holes spaced on 15-ft. centers, 10-ft. burden

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**Blending plant** where shoulder base stone, left, and sand, right, from stockpiles are blended to produce specification sub-base material. Screen at discharge end of sand conveyor scalps off clay lumps, wood, etc.

diesel engines. The 4033 hammermills on the secondary plants are the 3-spinner type, and the scalping screens are driven by Caterpillar D318 engines. The screening plants incorporate 4- x 14-ft. double-deck screens, having 1/2-in. top (relieving) decks and bottom decks with 3/4-in. and 3/8-in. openings. Bottom deck throughs are wasted, the 1 1/2- x 3/4-in. representing the finished product. Each plant also is served by two portable 5-cu. yd. truck loaders. Total output of the two plants is 2500 t.p.d. of finish product (2 shifts), with about one-third of the fines being wasted.

Stockpiling equipment comprises five Euclid 1 UD 10-ton trucks (two of which are also used in stripping), two 6-cu. yd. Koehring Dumpsters, and four International 6-wheelers. Quarry cleanup is handled by Caterpillar D7 tractor-dozer. A notable feature of the quarry is the unusually smooth, clean floor maintained by the operator, which contributes greatly to overall operating efficiency.

The washing plant consists of Cedarapids portable units and features an

interesting layout plus three-stage washing. Facilities include a primary Wash-All plant, a double log washer, a coarse material single screw classifier, a double-deck rinsing screen, and five lattice frame 30-in. conveyors, 50-ft. centers, driven through motorized head pulleys. The primary plant is fed from an 8000-ton stockpile, the 1 1/2-in. x 3/4-in. stone being reclaimed through a steel hopper and sliding gate to a portable conveyor. The reclaiming tunnel, 20 ft. long, is built of heavy timber.

The Wash-All plant consists of a 30-in. feed conveyor, 30-ft. centers, a 4- x 12-ft. triple-deck screen fitted with spray bars, and a 24-in. x 25-ft. Eagle twin screw fine material washer-classifier. The screen, having decks with 3/4-, 3/8- and 1/4-in. openings, respectively, divides the flow three ways. Bottom deck throughs are discharged to the twin screw, thence via 30-in. conveyor to a "waste" stockpile. Plus 3/4-in. material is taken by an off-bearing conveyor to a 7- x 30-ft. Eagle twin log washer, and 3/4 x 1/4-in. material is fed by another off-bearing

conveyor to a 36-in. x 18-ft. Eagle single screw coarse material washer-classifier. Products from the two Eagle units then rejoin at the rinsing screen for final washing; they are fed to the screen by portable conveyors. The rinsing screen is a 4- x 14-ft. unit, carrying 1/2- and 1/4-in. decks. Minus 1/4-in. material is belt-conveyed to the waste stockpile, and the finished product is taken by portable conveyor to an 18-ton truck loading bin.

The washing plant is operating at a 150 t.p.h. rate. All of the main plant units and conveyors, with the exception of the twin log washer, are driven by 440-v. motors energized by two G.M.C. 150 kw. 187.5 k.v.a. diesel generators; each generator is driven by a 110 diesel engine. The log washer is powered by a G.M.C. 671 unit.

**The blending plant**, set up adjacent to the washing plant, is a relatively simple operation. It involves the use of a 30-in. tunnel belt conveyor, 75-ft. centers, issuing from a 10,000-ton stone stockpile, which is intersected at right angles by a 30-in. belt, 50-ft. centers, issuing from a 3000-ton sand stockpile. The former conveyor, handling up to 400 t.p.h., discharges to an 18-ton truck-loading hopper. Generally 35 percent sand is required in the blend to meet the sub-base material specifications. Clay lumps, wood, etc. are removed from the sand, prior to blending, by a 3- x 6-ft. single-deck Kolman vibrating screen mounted at the discharge end of the sand conveyor. Both conveyors were supplied by Barber-Greene.

Water for washing is obtained from two shallow wells and two deep wells, the latter served by 6-in. Deming deep well pumps; it is delivered to the plant through 5-in. aluminum pipe. Loading from stockpile is handled by a Michigan 175A 2 1/4-cu. yd. front end loader. Two 20-ton truck scales are used.

Working under a 96-hour-per-week work schedule, the plant facilities are subjected to heavy wear. An example of this involves the hammermills in the secondary plants. Normal procedure is to turn the hammers every five days and to rebuild them with hard facing metal every ten days.

The Anderson company, headquartered in Cedar Rapids, Iowa, is headed by B. L. "Babe" Anderson—a veteran portable plant operator. Prior to the Turnpike job, Mr. Anderson produced aggregate and agricultural limestone from several quarries in northern Iowa.

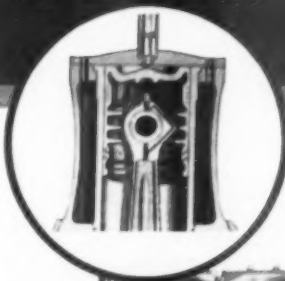
L. V. "Bill" Porter is superintendent of the Lawrence operation. Crushing plant foremen include Cliff Trinder, Francis Huffman, Harold Hite, and Arnold Moubry; washing plant foreman is Dave Lyons.



One of two 150-kw. diesel-generator sets serving the washing and blending plants



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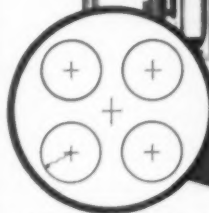
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Overall view showing heavy media separation section, to the left, and washing section, to the right

## How Bundy Hill Gravel Keeps Pace

### THIS ARTICLE

... tells how a southern Michigan sand and gravel company revised plant flow diagram by installing heavy-media separator and log washer to increase output of products that meet state specification

By GEORGE C. LINDSAY

**V**OLUME HAS INCREASED 300 PERCENT, and quality of the product has risen to meet stiff state requirements at the renovated plant of Bundy Hill Gravel Co., Hillsdale County, Mich. Installation of a Heavy Media Separation process plant and log washer has revised the plant flow diagram and has brought the production of a marginal pit up to standard requirements.

Prompted by a rising volume of road construction, the Bundy Hill firm, with pit and plant located 15 mi. south of Jackson, solved its marginal operation problem through effective engineering study and proper research methods.

The result, plant-wise, is a new sand plant that removes minus 1/4-in. material from the feed to the gravel plant. Raw gravel is upgraded now with the new log washer and Heavy Media Separation process. Plant volume has increased to 4000 tons of gravel per day of high quality processed products. Increased output of washed gravel meeting state specifications has improved the company's capacity for supplying the growing demand for gravel.

Since nearly 90 percent of good Michigan gravel has been depleted, there are now many marginal gravel

pits in the state. Bundy Hill management, with the assistance of the Michigan State Geological Survey, attacked its marginal problem first by gathering information on the geological nature of its gravel deposit.

Study results showed that the Bundy Hill 100-acre tract consisted of glacial kame, a deposit formed of rock and material pushed by the great Canadian glacier and settled from glacial streams. Total area of the glacial deposit extends 150 mi. across southern Michigan from Niles, near Lake Michigan, east to Ann Arbor. It also extends into northern Indiana and Ohio. The gravel pit at Bundy Hill, elevated 1385-ft., is the highest point in southern Michigan. This indicates the extent to which the glacial material was deposited there.

Further study showed that the deposit contained hard granites, quartz, and good gravel material such as limestone, traprock, and other types. Specific gravity of that material ranged from 2.60 to 2.75. However, analysis showed the presence of objectionable material that had to be removed from the final product. Objectionable material included the following.

1. *Soft sandstone and ochre*—Material is structurally weak and

will not satisfy state hardness specifications. Ochre is a soft yellow stone with a low specific gravity. Amount of this material in the deposit averages eight percent. Specific gravity of soft sandstone and ochre is 2.40-2.45.

2. *Chert*—This material will absorb water and thus is subject to freezing and thawing. Specific gravity ranges from 2.40-2.60, but the Michigan State Highway Department is now experimenting to determine whether chert material with specific gravity above 2.45 is objectionable. Chert comprises an average of five percent of the Bundy Hill deposit.

3. *Clay*—No clay is desired in the final gravel products at Bundy Hill, and essentially all is removed.

4. *Limonite concretions*—This is a hard iron-bearing stone inside of which is material that ranges from soft clay to soft stone. The outer layer is a reddish-brown color and is sufficiently hard to pass hardness tests. But the soft inner material is absorbent and subject to freezing and thawing, causing explosive expansion if

(Continued on page 176)



(Illustration from Agricola's De Re Metallica (1621))

## All ore processing was difficult 400 years ago

There was a time when the grinding in an ore preparation plant consisted of a man with a hammer—like the one shown here, equipped with heavy leggings and gloves to protect himself against flying ore chips.

Today's ore processing plant is a far cry from this. It utilizes efficient grinding mills

that turn out many tons of processed ore every day—mills which so often use CF&I Grinding Balls and Rods. CF&I Grinding Balls and Rods are always made from special analysis steel that has the ideal balance between toughness and hardness to assure optimum grinding ability and maximum wearability.

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ROCK PRODUCTS, August, 1956



**Close-up of heavy media separation plant.** The 8- x 8-ft. Mobil-Mill drum discharges to vibrating screen with the desired aggregate moving up belt conveyor to bin. Magnetic separator is located near leading edge of platform

contained in finished concrete. Although some deposits in this area contain as much as five percent, the amount of limonite in the Bundy Hill deposit is less than one-half of one percent.

Analysis of the deposit was studied in relation to state requirements on various grades of stone. Comparison determined the kinds and quantities of the objectionable material that had to be removed. Table 1 gives some indication of the processing job necessary to produce two specific kinds of aggregates. There is no problem in the removal of hard and absorbent stone in production of Michigan 4-A and 10-A grades. Limonite particles are unwanted, however. The major job is removal of soft sandstone and ochre.

**A Heavy Media Separation process** could give required results, Bundy Hill officials found after running sink-float tests and analyzing the materials in the deposit. Operating specific gravity of HMS units can be controlled closely, so that quantities of objectionable material in processed products may be regulated. Since cherts and soft sandstone materials had a top specific-gravity rating of 2.60, it was decided such a unit could be installed to operate at that specific gravity with success.

In 1955 a Wemco Mobil-Mill, a package-type pre-fabricated HMS plant, was installed in the flow diagram to process  $2\frac{1}{4}$  x  $\frac{1}{4}$ -in. raw or crushed material. The unit was the fifth plant to be installed in the U.S. gravel industry, and the third in Michigan. It operates at 2.60 specific gravity. Resulting stone products are satisfactory. End products contain an average of three percent objectionable materials in the minus 1-in. size, whereas spe-

cifications allow ten percent. Such materials amount to four percent in the processed  $2\frac{1}{4}$  x 1-in. size; specifications allowed eight percent.

In operation at 2.60 specific gravity, in which an attempt was made to remove all clay material, the washing plant reject runs 25-30 percent of 100 t.p.h. feed to the unit. Also, 60 percent of the reject material (15-20 t.p.h.) consists of granite and quartz gravel, a premium marketable product. Study of the problem showed that good stone with adhering clay material, giving the combined clay and stone particle a lower specific gravity, would wash over to reject. Thus, some method of removing clay from the feed to the heavy-media unit was desired.

The plant flow diagram was revised further to include a 24-ft. Eagle log washer with twin 36-in. logs. That unit was installed to receive raw or crushed  $2\frac{1}{4}$  x  $\frac{1}{4}$ -in. size from the primary sizing screen in the washing plant. Capacity of the unit is 100 t.p.h. The log washer grinds clay and ochre for removal from the heavy-media unit feed without affecting the stone size. A mechanical abrasion motion used in the log washer does that work. Water is added in sufficient amount to remove clayey material from the feed and reject it in liquid form.

After the log washer was installed and the clay removed from the feed, it was possible to operate at a lower specific gravity of 2.50 and retain more stone at this lower specific gravity while still staying well within the overall specifications. Reject at this lower specific gravity of 2.50 averages only 12-15 percent of the Mobil-Mill feed.

Sand and gravel are mined from the 100-acre Bundy Hill tract by two  $2\frac{1}{2}$ -cu. yd. Lorain 820 draglines, each powered with a Caterpillar D-13000

diesel engine. Raw material is loaded at 500 t.p.h. into two steel hoppers on the pit floor. The bottom of each hopper is equipped with a 24 x 72-in. reciprocating plate feeder that discharges to a 30-in. belt-type field conveyor, 200 ft. long. Each conveyor discharges to a common 30-in. belt conveyor, also 200 ft. in length, installed at a 19-deg. inclined angle to reach the top of a 45-ft. high desanding plant adjacent to the pit.

At the head of the desanding plant, feed from the pit discharges through a feed box to a 5 x 14-ft. Simpliflo two-deck vibrating screen. Water is added to the feed at this point. It is obtained from a 12-in. cased well, 312-ft. deep, through a 12-in. Layne Northern deep-well turbine pump with 8-in. column set at a 180-ft. depth. Rate of water flow added to the raw feed on the screen is 1200 g.p.m.

Minus  $\frac{1}{4}$ -in. sand and water through the bottom deck of the screen are flumed temporarily to a stockpile in the pit. Plans call for further processing by settling-type classification into masons sand and concrete sand.

**Ground storage of gravel** is divided into two sections under the desanding plant by a bulkhead built on a plant support frame. Over product of the bottom deck of the screen ( $\frac{3}{8}$  x  $\frac{1}{4}$ -in. pea gravel) is chuted to a 20-ft. belt conveyor that discharges to the pea-gravel ground storage. Product over the top screen deck (9 x  $\frac{3}{4}$ -in. raw gravel) is chuted to ground storage on the opposite side of the bulkhead.

The main feed belt conveyor for the washing plant, a corrugated steel-lined tunnel, is directly under the divided ground storage pile. Two Model 4 Jeffrey-Traylor 24 x 48-in. vibrating feeders are installed under each pile through openings in the tunnel liner. Feeders rated at 100 t.p.h. are controlled remotely through rheostat connection. Blending of sizes on the wash-plant feed conveyor may be regulated as desired to fit requirements.

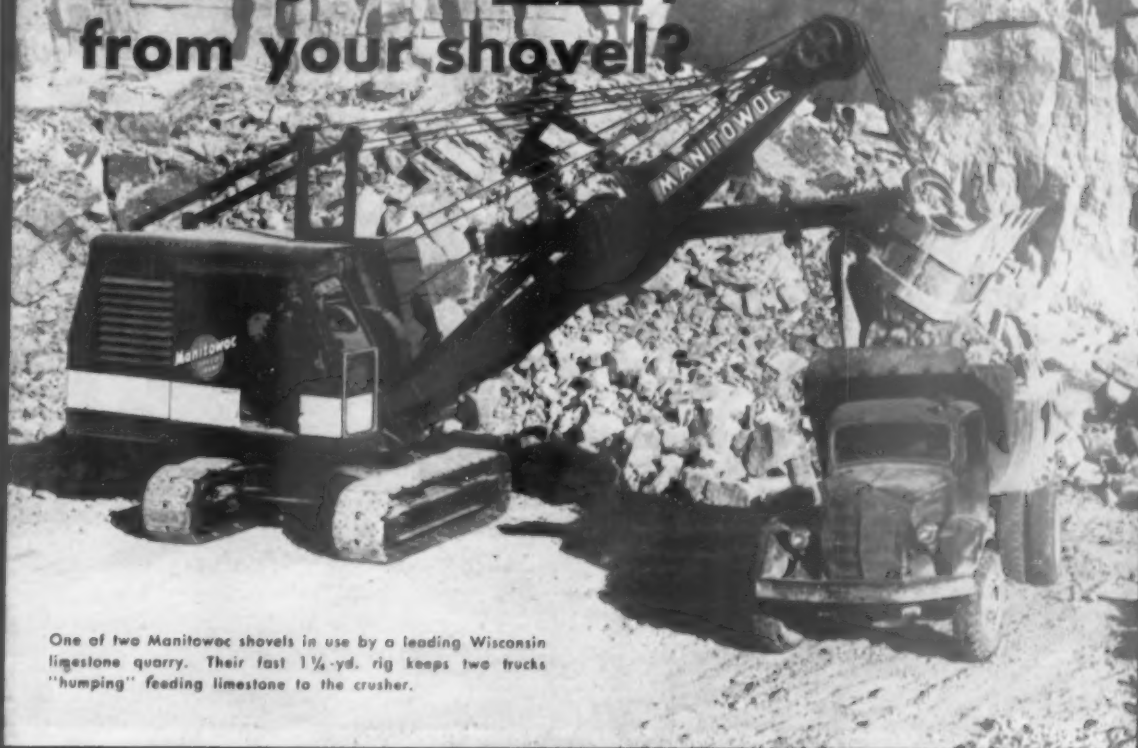
The storage-pile collection belt, or washing plant feed belt, is 30-in. in width and 200 ft. in length. It is installed on a 6-deg. inclined angle for a distance of 40-ft. at the feed end. The next 69-ft. of belt length is installed on a vertical curve with a radius of 350-ft. The remainder is on a 15-deg. inclined angle to reach the top of the primary screening section of the stone processing plant.

Feed to the stone plant is received on a 4 x 14-ft. Simpliflo three-deck vibrating screen through a feed box. A complete crushing plant receives the over product of the top screen (plus  $2\frac{1}{4}$ -in. size) from a belt conveyor.

(Continued on page 179)



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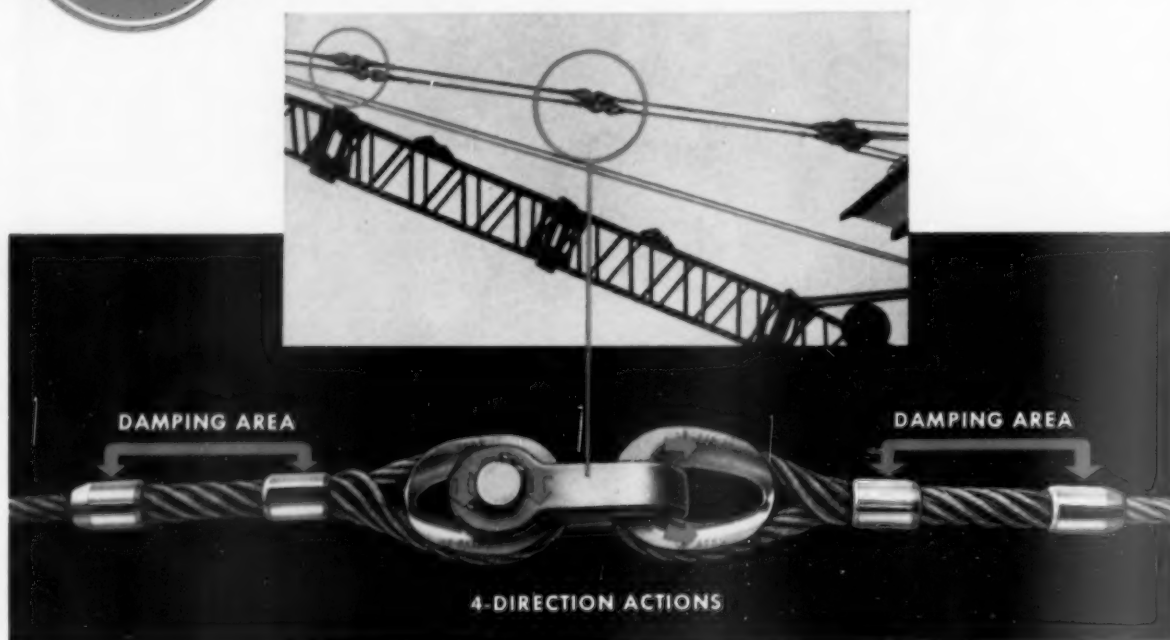
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W. G. Smith and Richard Davidson inspect the clean gravel produced by the heavy media separation unit

ed that fine sand particles blinded that screen and resulted in an excessive loss of medium.

It also is possible to make Michigan 6-A (minus 1½-in.) and 4-A grades at the same time. Top deck of the screen over the clean-stone bin is changed to a 1½-in. wire mesh cloth. Thirty-five percent of the 1½ x ¾-in. intermediate screen product is added to the 2¼ x 1½-in. top screen over product to make 4-A grade. The remainder is added to the minus ¾-in. size to make the 6-A grade.

Sizes may be loaded under the bin directly into trucks. For stockpiling purposes, a 100-ft. stacking conveyor is available for each size to deliver to ground storage.

Reject material from the washing plant is delivered from the reject portion of the drainwash screen to an 18-in. belt conveyor, 15 ft. long. That conveyor discharges to trucks that haul reject material to a disposal area.

Results of the full plant renovation program at Bundy Hill include two specific operating benefits. Addition of the heavy-media separation unit and log washer has allowed the preparation of highly acceptable products from a marginal gravel deposit. At the same time, volume of rated output has been boosted 300 percent.

Bundy Hill Gravel Co. is a wholly owned subsidiary of L. A. Davidson Co., which is a construction company located in Lansing, Mich. The firm, owned by L. A. Davidson, operates in Michigan, Indiana, and Ohio.

Project manager in charge of Bundy Hill is R. A. Davidson. He is also outside project manager for L. A. David-

son Co. W. G. Smith is superintendent of the Bundy Hill operation; Milton Kies is operator of the heavy media plant.

Durability factor on a composite sample of HMS gravel in 1955, taken

and tested by the Michigan State Highway Department, was 91. By comparison, average factor on ordinary gravel in this area of the state is usually below 45-50, so that improvement in the product is evident.

## Report Increasing Agstone Sales At N.A.L.I. Board Meeting

**F**AR REACHING SUBJECTS affecting all segments of the agricultural limestone industry were discussed at the mid-year board of directors meeting of the National Agricultural Limestone Institute, held at the Chase Hotel in St. Louis, Mo., on June 4 and 5. Many of the directors were present and were accompanied by their families, bringing the total attendance up to 73. Members gained a broad insight into the useful activities carried on by the association, along with plans for the future.

The first day's constructive activities included a morning meeting of the executive committee, and a joint luncheon of committeemen. The afternoon was taken up by meetings of 14 individual committees.

On June 5, following committee reports, Robt. M. Koch, executive secretary, reported that while both A.C.P. appropriations and agricultural limestone sales reached a record low two years ago, reports from around the country indicate that sales are up 20 percent to 50 percent in some areas. Much of this is due, he said, to the relaxing of many restrictions in the A.C.P., brought about in part by constructive criticism from N.A.L.I. In addition to many other accomplished liberalized measures, provisions have been made to use the \$30 million which have been turned back each year recently as unused A.C.P. funds due to cumbersome fiscal year methods and generally restricted procedures.

Through operation of joint programs with the unused funds eligible for next year's program and through use of more liberal procedures, the full benefit of the \$250 million authorized for conservation measures on the nation's farms will be realized, he indicated.

Speaking on the Soil Bank program, he said that much work was expended in obtaining a program that would be useful as far as conservation is concerned. However, the bill has a watered down provision for use of the \$450 million for the conservation reserve acres. Only time will tell the full value of this phase of the Soil Bank pro-

gram. The present authorized payment rate on A.C.P. is 50 percent, and efforts will be continued to raise this to 80 percent, Mr. Koch stated. Much work has been done in assisting Congress to make valuable decisions in regard to the proper protection of our nation's resources.


Recent changes in by-laws, as reported by W. H. Litterer, by-laws committee chairman, provide for less power in the hands of the executive committee and leave major policy decisions with the board or members. E. B. Snead reported that the legislative and public relations committee will continue the same activities in these fields. William E. Stone, membership committee chairman, reported that eleven new members have been gained as well as two members in the Manufacturer's Division. Plans were outlined for an aggressive new membership campaign to be launched immediately.

Reporting for the percentage depletion committee, Kenneth W. Horne said that the Williams-Heselton and Reuss bills to reduce percentage depletion rates for all minerals including agricultural limestone and road stone will die in this Congressional session from inaction. It is hoped that the Martin bill, which would give fiscal year companies the same status as calendar year companies, will pass in this session. It was reported that several members have court cases pending, but none have reached trial yet.

A report by Lynn N. Stewart, chairman, promotion and educational committee, revealed that the use of promotional material is off, but that the news release service has been growing steadily with nearly 3000 outlets being serviced by members. It was recommended that one new circular and an additional fair exhibit be prepared.

L. R. Falk, chairman, convention arrangements committee, reported that the annual N.A.L.I. convention for 1957 would be held from January 19 through 23 at the Hotel Statler in Washington, D. C. The 1957 mid-year meeting of N.A.L.I. board members will be held at the Edgewater Beach Hotel, Chicago, third week in June.





**do you get  
production  
like this?**

**120 tph of  $\frac{3}{8}$ "  
150 tph of  $\frac{7}{8}$ "  
100 yd. ph of  
 $\frac{3}{4}$ " road gravel**

### **"Lippmann Portable Dual Crushing Plant cannot be matched" says Ontario contractor**

Glenn S. Coates, president of Fowler Construction Co., Bracebridge, Ontario, reports on the performance of their Lippmann dual portable crushing plant—a story of real output from several pits—best told in his own words:

"From the first of June to the end of December, we have crushed 91,239.3 tons and 35,501.5 yards of gravel in different locations. It can be seen that we have had considerable moving time. The time lost for moves is as small as any portable we have seen.

Our production has averaged 120 tons per hour of  $\frac{3}{8}$ " materials, testing 55-60% stone, and 150 tons per hour of  $\frac{7}{8}$ " materials, testing 45-50% stone. Both of these items are Government test, mainly for asphalt use. Our production of  $\frac{3}{4}$ " Township road gravel, testing 50% upwards of stone, has averaged 100 yards per hour. We are pleased with the output, as in every case it has

*been higher than the Lippmann people estimated.*

We consider our plant the largest portable plant in one unit in the Province of Ontario. The 12" x 36" jaw, and 40" x 20" rolls with the 4' x 12' screen and 30" belts throughout cannot be matched in one unit by any other make.

Our production figures are *not overstated, or based on our best day's run.* They are taken on average from many pits and conditions and in very few cases were there any days with lower amount than those quoted herein.

The plant maintenance on the Lippmann is, we believe, as low or lower than any plant crushing under similar conditions. We have no hesitation in recommending the Lippmann equipment to any prospective purchasers and we will frankly discuss its merits with anyone referred to us."

Owners of Lippmann Portable Crushing plants cite other reasons why they like their Lippmann plants, such as the balance between all the components that eliminates lost motion and saves power . . . the good stability and arrangement that makes them so mobile . . . the fact that they require no blocking or jacking for quick and easy set-up. Also mentioned is the exceptional performance of the individual components, such as the famous Grizzly King or Rock Ram jaw crushers, superior roll crusher secondaries, Screen-All screens and Ever-Seal conveyor idlers that never need greasing.

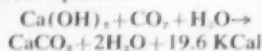
Those who want to know more about the kind of performance Lippmann machines turn out—whether it's crushers, feeders, screens or complete plants—can learn by contacting a local Lippmann Dealer, or Lippmann Engineering Works direct at 4605 West Mitchell Street, Milwaukee 14, Wis., U.S.A.

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# Carbonation of Lime Putties To Produce High Grade Building Units

By NISSAN ZALMANOFF\*

**C**ARBONATION OF LIME-HYDRATE is described by the following general chemical equation:



It is a reaction of an heterogenous nature where the solid, liquid and gaseous phases take part together. It seems very probable, due to the ionic nature of the process, that the main reaction of precipitation takes place in the liquid phase of the system. It must be expected therefore that the gaseous  $\text{CO}_2$  has to go through a preliminary process of solution, which in itself involves quite a complicated mechanism. At the same time the solid hydrate also has to enter the liquid phase by its solution therein before any ionic reaction can occur. Furthermore, care should be taken to remove the resulting precipitate from the system in order to enable the reaction to proceed to its completion.

The chemical process becomes even more complicated if larger quantities of lime putty, required for the manufacture of building units, are involved. A lime putty presents a highly concentrated colloidal dispersion system, where solid particles of calcium-hydrate are dispersed in its saturated solution. The dispersed particles are enveloped by the dispersion-medium, the latter being continuous through the entire mass and interrupted only by the included solid phase. This continuity of the liquid phase in the putty impedes to a very large extent the reaction from proceeding with efficient velocity. Since the process is concerned with a reaction between two compounds, one in the gaseous state and the other in the solid, the theory of the "double film" established by Lewis and Whitman has to be referred to in order to understand its mechanism. From this theory, it follows that the reaction of the precipitation takes

## Synopsis—

• Carbonation of lime-putties, using a defined controlled process, has been shown to result in a construction material having high mechanical strength of the same order of magnitude as units made with portland cement. Out of an investigation of this process of continuous precipitation of the carbonates in lime-putties, the characteristic hydraulic qualities of the carbonate-compounds were determined. Different types of building units, both reinforced and unreinforced, were prepared by the author in the laboratory as well as in the plant, through the carbonation of mixtures of lime-putties and aggregates. Taking into consideration the extreme economic value of this new building material, future revolutionary changes in the manufacture of prefabricated building elements may be expected.—THE AUTHOR.

place only in narrow limits on the outer surfaces of the putty.

Considering the insignificant magnitude of these reaction surfaces in comparison with the large quantities of material, and disregarding the factor of small amount of dissolved hydroxide diffusion from the center of the putty to the outer surfaces, it may be assumed that practically there will be no carbonation of the mass. Furthermore, even if the reaction occurs at a few points inside the putty, due to the interruption of its continuity, note that the water which is the product of the reaction will fill the voids and stop the reaction instantaneously. A conclusion (confirmed by the author's experiments) is that masses of lime-putty kept in closed vessels, in which high concentrations of  $\text{CO}_2$  are maintained, will remain inert to the gas even after a long period of storage therein.

For the chemical reaction to take place in effective velocity with practical quantities of lime-putty, additional surfaces of greater magnitude should be exposed to the reaction; care should be taken that during the entire process the surfaces will remain exposed to the gas, and that the passages leading to them from the outside will not be blocked by the water resulting from the chemical reaction. This can be done by continuously removing the mixing water and reaction water through evaporation simultaneously with the carbonation process, thus leaving the hydrate or the partly carbonated material in the form of a porous

gel characteristic of the structure of solid, hydrated, inorganic oxides. However, at the same time, care should be taken during the reaction to leave in the system sufficient quantities of liquid to envelope the dispersed solid particles and to act as a medium in which the reaction between the gas and the solid hydrate will take place.

In lime putties that have been dried out under normal conditions of the atmosphere there always will remain small quantities of liquid on the solid skeleton of the lime, as the result of the absorptive qualities of the putty characteristic of similar colloidal gels. The amount of this water absorbed on the air-dried putty (removable at 110 deg. C.) lies between one and 2 percent; it varies within these limits according to the changes of the temperature and relative humidity of the surroundings. It has been proved that the structure of air-dried lime putty fulfills the optimum conditions described above, required for the reaction to proceed with efficient velocity. The only reason for the slowness with which lime putties are carbonated in the atmosphere is the fact that the  $\text{CO}_2$  concentration in the air is low. The relatively extensive evaporation of water from the putty under atmospheric conditions makes the putty ready for an uninterrupted carbonation process, the small amount of  $\text{CO}_2$  concentration in the air being the only reason for the slowness of the reaction.

(Continued on page 184)

\*Chem. Engineer, Hebrew Institute of Technology, Haifa, Israel

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 Diesel, gasoline, LP and natural gas  
 Engines, power units, generating sets

Now...  
 to meet your needs

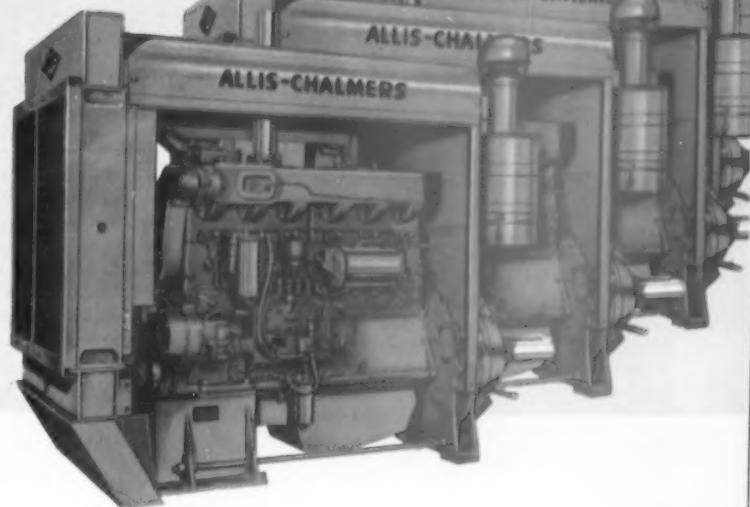
**MORE**

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 ENGINES**

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- improved standards
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- greater parts availability
- more parts interchangeability

The production of Allis-Chalmers engines goes up, up, up to meet your needs. The 1956 production is expected to reach an all-time high — and 1955 output was many percent greater than 1954's. A multi-million-dollar expansion of facilities will further boost production.

But there are not only *more* engines to meet your needs, there are *better* engines — as Allis-Chalmers research and development continues to pioneer improvements, and as production and inspection standards are set even higher.

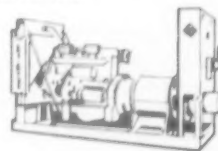


Along with this comes an expansion of customer service and greater parts availability, too, as sources of parts and service are moved closer to you.

*More and more, it's Allis-Chalmers engines and service to meet your needs.*

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*A complete line of improved engine generator sets from 5 to 300 kw, for emergency and continuous duty, for marine, cooling tower and industrial use.*



1954	
1955	
1956 Estimated	

The 1956 production of Allis-Chalmers engines will reach an all-time high, with output many percent higher than in previous years.

**ALLIS-CHALMERS**



An artificial increase in the  $\text{CO}_2$  concentration increases the rate of carbonation in proportion to the concentration of the  $\text{CO}_2$ , provided suitable steps are taken to remove the resulting water from the putty with sufficient velocity. However, the resulting change in the rate of carbonation does not alter the nature of the reaction itself. Hence, the qualities of the final carbonated product remain the same. In both cases, either in the rapid process involving high artificial concentrations of  $\text{CO}_2$  or in the slower carried out in low concentrations of the air, the final completely carbonated material possesses mechanical strength much below the regular standards required for structural building elements.

Not much is known about the detailed structure of rigid gels of the types of inorganic oxides and their hydrates. For theoretical calculations, we shall describe schematically the structure of lime putty when arranged in its ideal theoretical form. Typical solid particles of the hydrate take the form of rectangular plates arranged parallel to each other, thus occupying the minimum volume. It is a well known phenomena that such an arrangement generally is responsible for the plastic properties of various materials. Since a basic characteristic of lime putty quality is its plasticity, and since it has been proved by research that hydrate particles of lime have the shape of a flat square plate, this will be taken as a basic assumption for the following theoretical calculations.

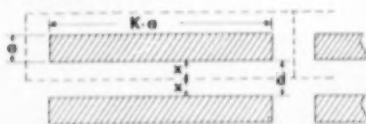
Let us describe a characteristic sample of lime putty having a water content of 95 percent by weight, which corresponds approximately to the "Standard Consistency":

$$\text{Ratio of weights: } \frac{M \text{ H}_2\text{O}}{M \text{ Ca(OH)}_2} = 0.95$$

$$\text{Ratio of volumes: } \frac{V \text{ H}_2\text{O}}{V \text{ Ca(OH)}_2} = 2.2$$

$$d \text{ H}_2\text{O} = 1.0 \quad d \text{ Ca(OH)}_2 = 2.3$$

According to these assumptions, the structure of the ideal form of the putty of maximum plasticity can be described as follows:



There is much experimental evidence in the technology of lime that the drying of lime putty from its usual consistencies (in the lower range of the "Standard Consistency") involves almost no shrinkage if dried out slowly in moderate drying conditions. This points us to another important concept: that the structure of the solid

skeleton and the distances between the various parts of the system do not change much during a process of a careful drying. After the complete removal of the water from the putty, the solid structure retains approximately its former shape. Therefore, the condition inside a dry putty can be described by:

$$\frac{V \text{ voids}}{V \text{ Ca(OH)}_2} = 2.2$$

For example, assume the ratio between the length of the hydrate particle and its thickness:

$$K = 10$$

$$\begin{aligned} \text{It follows: } & \frac{(a + 2x)(10a + 2x)(10a + 2x) - 100a^3}{100a^3} = 2.2 \\ & 8x^3 + 84ax^2 + 240a^2x = 220a^3 \\ & x = 0.75a \\ & d = 1.5a \end{aligned}$$

It follows that the distance between two adjacent particles is about 1.5 times the thickness of the particle.

What is the condition inside an "air-dry" putty? The liquid is absorbed here on the hydrated solid plates, enveloping them as a film. It amounts to about 1.5 percent of the weight of the solids. This can be expressed:

$$\frac{M \text{ H}_2\text{O}}{M \text{ Ca(OH)}_2} = 0.015; \quad \frac{V \text{ H}_2\text{O}}{V \text{ Ca(OH)}_2} = 0.035$$

If thickness of liquid film is denoted by  $y$ , then:

$$8y^3 + 84ay^2 + 240a^2y = 3.5a^3$$



Because of the small value of  $y$ , its powers can be neglected and the solution of the equation will be:

$$\begin{aligned} y &= \frac{3.5a}{240} \quad \frac{y}{d} = \frac{1/70a}{1.5a} \sim \frac{1}{100} \\ y &\sim \frac{1}{70a} \end{aligned}$$

It means that the distance between the surfaces of two adjacent liquid films in a lime-putty of a "Standard Consistency", which is an "air-dry" condition, is about 100 times the thickness of the films themselves. Any alteration in the ratio of the dimensions ( $K$ ) of the typical plate of the hydrate does not change the order of magnitude of this figure. By introducing different values for the coefficient  $K$  in the above calculations:

$$K = 1 \quad \frac{y}{d} = 1.2 \times \frac{1}{100}$$

$$K = 100 \quad \frac{y}{a} = 0.8 \times \frac{1}{100}$$

Also, when the drying process in air starts from a concentration which is higher than that of the "Standard Consistency", it will not influence greatly the proportion of the distances between the liquid films and their thicknesses. A lime putty with a water content of 65 percent by weight (which represents a thick putty) when air-dried, gives the ratio (when  $K = 10$ ) as follows:

$$\frac{y}{d} = 1.4 \times \frac{1}{100}$$

These calculations are theoretical in nature and refer to ideal structures of lime putties or those air-dried. No definite conclusions can be drawn from them with regard to the real structure of the material. However, the above calculations present a favorable picture with respect to the size of the distances existing in masses of lime

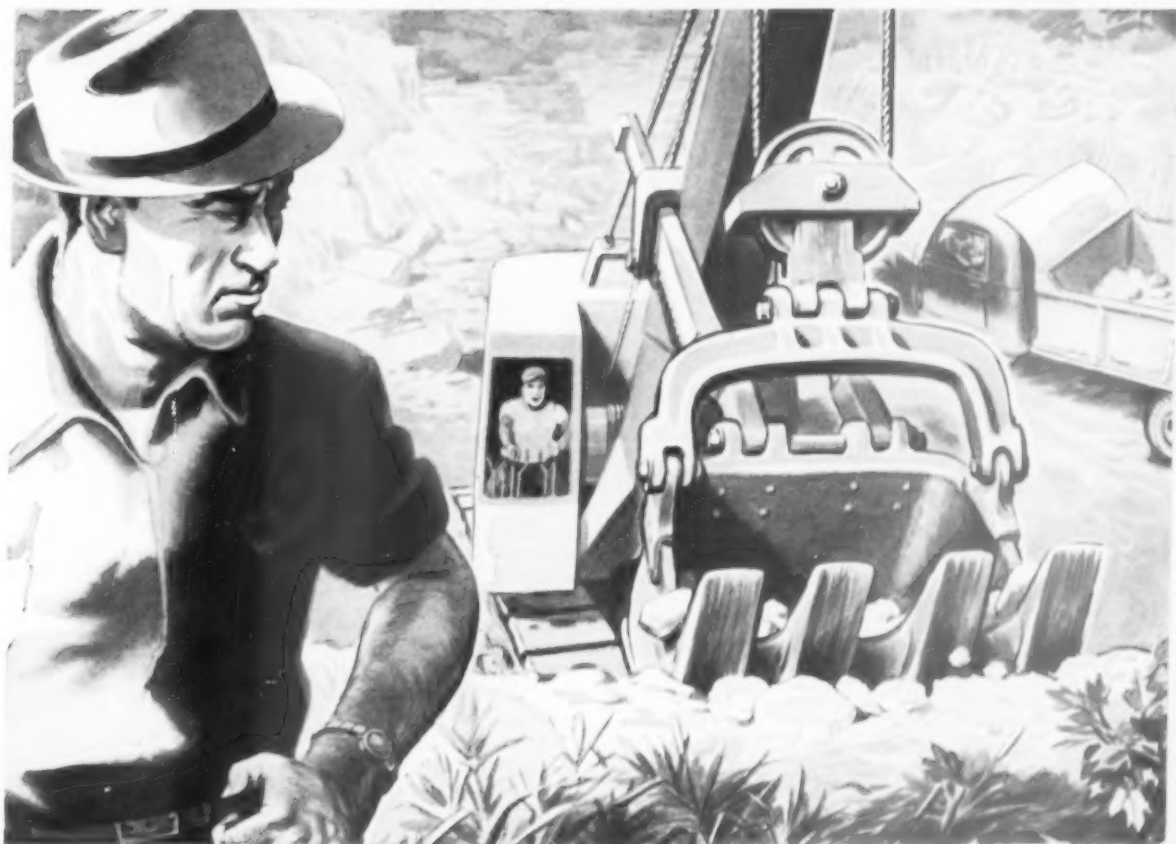
putty. In systems as described, representing air-dried putties, in which the distance between two adjacent liquid films is about 100 times the thickness of the film itself, there is practically no continuity of the liquid phase. It can be assumed, therefore, that a lime putty in an "air-dried" condition is built up of separate microscopical systems, where each system consists of a solid particle surrounded by a liquid layer. The minute continuity among the different systems, as far as it occurs, results from the deviation of the real structure from the theoretical structure described above.

During the carbonation process of the air-dried putty each microscopical system of the solid-liquid reacts separately and independently. Precipitation of the carbonate apparently starts in each system at a few active carbonate-nuclei (resulting from impurities) that the hydrated plates contain. The carbonate precipitate grows continuously in each separate system until the whole hydrate-particle is transformed into carbonate. As pointed out, the increase in the concentration of  $\text{CO}_2$ , although it accelerates the process, does not change either the mech-

(Continued on page 186)



It's time to compare...with **LINK-BELT SPEEDER**



## ***Shovel-Crane owners!*** **Paying for power you never get to use?**

**Link-Belt Speeder machines  
are built to take full advantage of  
the "bonus" horsepower available  
in shovel-crane engines!**



**S**IZE for size, a Link-Belt Speeder gives you more *usable* horsepower. You get more line pull, more power at the bucket teeth... more power to swing, hoist and travel. That's because a Link-Belt Speeder takes more power out of its engine!

You see, a Link-Belt Speeder is built with extra strength—strength to handle greater horsepower. Thus, the engine in a Link-Belt Speeder can be (and is) set to deliver the greater horsepower for which the machine is designed. Link-Belt Speeder

gives you a bonus of up to 40% more *usable* horsepower than machines using the same make and model engine! And, in every instance, the engine in a Link-Belt Speeder is run at speeds well within the manufacturer's recommendations.

### **How to compare**

Your Link-Belt Speeder distributor will furnish complete specification information. Check sizes and materials in Link-Belt Speeder shovel-cranes that allow you to use the actual horsepower you are paying for. **LINK-BELT SPEEDER CORPORATION**, Cedar Rapids, Iowa.

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## **LINK-BELT SPEEDER**

*Builders of a complete line of shovel-cranes...  
with exclusive Speed-o-Matic power hydraulic controls*

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anism of the reaction or the properties of the final product.

As a result of the complete carbonation, which may take a shorter or longer period according to the concentration of the active  $\text{CO}_2$ , a carbonated material results. Its internal structure greatly resembles that of the hydrate out of which it was obtained. Forces acting between the various plates in the new carbonate body, obtained by the above method, are of same nature as those that previously had acted in the hydrated rigid putty. Secondary forces resulting from the exposure of abundant surfaces, which are characteristic of colloidal systems, are responsible for the mechanical strength of the carbonate material in the same way they were in the hydrated putty. It follows that a carbonate material in which the carbonation process has been carried out by the above method possesses a low mechanical strength, about the same as the dried lime putty, which is much below the standards of construction building units.

To cause a fundamental change in the mechanical strength of the final artificial carbonated lime putty, we must deal with the forces acting between the different particles. A single crystal is the ideal internal structure of a solid precipitate obtained from the solution or from the melt, since it possesses the maximum of stability and mechanical strength. This ideal result cannot generally be achieved in practice due to the differences in the thermal conditions existing in the various parts of the system during the process of precipitation and to impurities and other obstacles which cause the creation of a crystalline lattice instead of the ideal crystal. If the precipitation has been carried out under optimum conditions, the polycrystalline substance obtained will be built of well arranged crystals lying one beside the other in a repeated pattern, a condition responsible for the stability of the precipitate.

A well arranged polycrystalline precipitate is obtained as a result of a slow continuous precipitation of a substance from its solution or its melt. The outer surfaces of the solid phase, which is being built in this way and which is exposed to the liquid phase of the system, are maintained during the process in a highly energetic state due to the difference in the intensity of the forces acting on them from opposite directions. This specific quality of the interfaces causes an electrostatic field in their vicinity that tends to direct the precipitating particles, at the time of their joining the solid lattice, in such a form that the decrease in the total potential energy will be the maximum. This behavior is possible only

provided the precipitating particles have a sufficient grade of mobility to be directed easily by the above described forces, which means that they should be in the liquid phase. It follows that if a well arranged lattice of crystals is desired, care should be taken first to establish an uninterrupted continuity of the liquid phase among the surfaces of those parts of the precipitate exposed to the solution out of which the precipitate is being built.

It has been indicated that conditions completely opposite to the above optimum prevail during the carbonation process of the air-dried putty. Theoretically, referring to putties with ideal structures for maximum plasticity, there will be no continuity of the liquid phase among the interfaces of the precipitated particles at the time of their joining the lattice. Every hydrate aggregate fulfills for itself the requirement of continuity of the liquid during the crystallization, and therefore after carbonation each of them will consist of a well-arranged lattice with good mechanical strength. However, our interest is not in the nature of the single aggregate in the body, but mainly in the forces acting among them, these being responsible for the over-all mechanical strength of the macrostructure in the above case, the inter-crystalline forces are of a low magnitude due to the pronounced discontinuity existing between the particles at the time they are being formed.

This concept may serve as an interpretation of the phenomenon we witness of a slight increase in the mechanical strength of an air-dried putty exposed to  $\text{CO}_2$  along with the increase in its carbonate content. This increase of the mechanical strength may be referred, according to the above concept, to the slight continuity of the liquid phase existing in the air-dried putty, due to the deviation of its structure from the ideal. The surfaces of the particles in the real putty not being absolutely parallel to each other and their size not being equal, presence of impurities, and many other practical factors are the origin of a poor network of liquid film continuity surrounding the solid skeleton of the air-dried putty. Crystallization out of a system that possesses a certain network of continuity of the liquid at the time of the reaction is involved in continuous growth of strength together with the progress in the crystallization.

If the above theory be true, then any decrease in the thickness of the enveloping liquid films of the dispersed particles in the putty will make the net of continuity poorer, thus resulting in a decrease of the final mechanical strength of the carbonated ma-

terial. This was verified by a series of experiments carried out by the author, in which specimens of lime putty were exposed to severe drying conditions (low relative humidity) resulting in reduction of the water absorbed on the dried gel. After carbonation of these specimens, they showed a considerable decrease in their mechanical strength compared with the strength of those that were dried in the normal atmospheric conditions and then carbonized.

Hence, the following conclusions can be drawn:

1. The continuity of the liquid phase of a lime putty at the time of its carbonation is the origin of the evolutionary increase of the mechanical strength as a function of the elevation of its carbonate content.
2. Absolute continuity of the liquid phase in technical quantities of lime putties prevents the process from taking place at an efficient rate.

*(To be continued)*

## N.C.L.I. Board Meets

NATIONAL CRUSHED LIMESTONE INSTITUTE, Washington, D. C., held its mid-year board of directors meeting at the Chase Hotel, St. Louis, Mo., June 5 and 6, with over 40 directors and their families present. It was decided to hold the N.C.L.I. annual convention at the Statler Hotel in Washington, D. C., at the time of the presidential inauguration. Committees will meet Monday, Jan. 20, and the membership meeting and formal sessions will be held on Jan. 23.

The membership committee under the chairmanship of director Robert Patton plans an aggressive membership drive. It was also decided to hold state membership meetings arranged by association directors and members of that state, at which Robt. M. Koch, executive vice-president, would be present for a general discussion of the association's aims and program.

In Mr. Koch's executive report on June 6, he stated that the Highway bill passed by the Senate was the largest peacetime appropriation ever committed, and that it was an unprecedented piece of legislation. However, most people think that everything is settled for the next 13 years, which is not the case, since the general authorization bill is to be reviewed every two years by Congress.

WHITE PIGMENT CORP., South Wallingford, Vt., is now operating a crushed stone plant at the deposit which was opened last year. White Pigment produces calcium carbonate fillers and pigments at the Florence and Norristown, Penn., finishing plants.

# JALLOY takes the beating



Quarrying operations demand tough trucks and tougher truck bodies. This 15-ton, rear-dump Euclid relies on Jalloy plates for rock-resistance.

## Jalloy heat treated steels . . . cut maintenance—give longer wear life

Jalloy—special purpose steels that are heat treated to provide longer wear on applications where impact and abrasive conditions are severe—last 4 to 20 times longer than conventional mild steels. Furthermore, they are easily welded.

Jalloy is available in three grades:

**No. 1**—for applications requiring excellent formability or where a low carbon alloy steel possessing good physical properties before or after heat treatment is specified. This is an ideal carbonizing grade.

**No. 3**—a general purpose steel capable of being heat-treated to excellent physical properties. Compared to ordinary mild steels it offers good resistance to abrasion or wear in the as-rolled state; but when heat treated to Brinell 340 and above, optimum abrasion and impact resistance is secured.

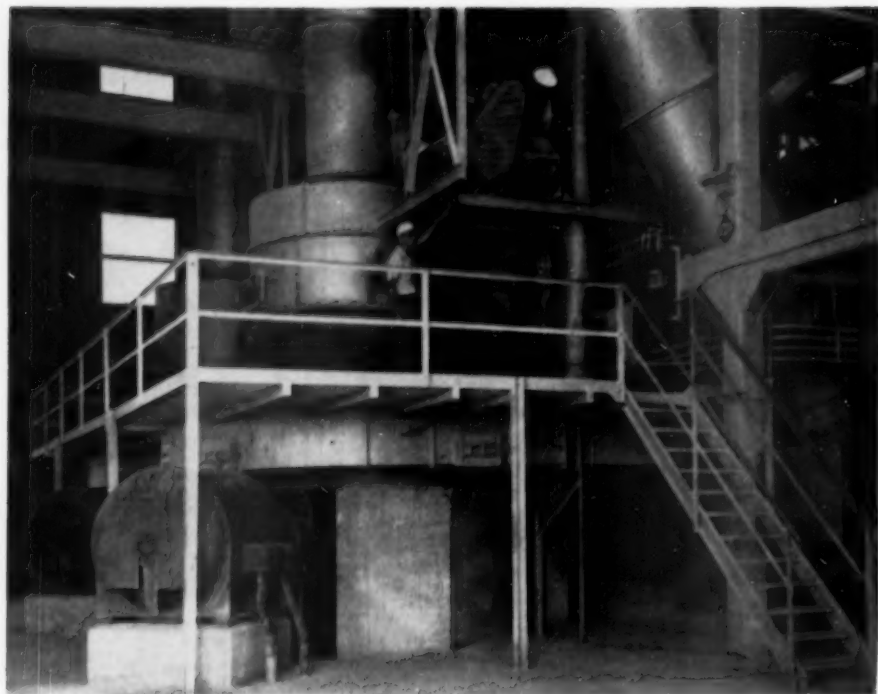
**No. 7**—possesses high hardness together with good ductility or wear resistance. Excellent for spring applications as well as flat work.

Jalloy high strength steels are available as plates, structurals, bar and small shape sections, hot rolled sheets, as well as strip and wire products.

Complete data concerning  
*Chemical Composition . . . Heat Treatment . . . Weldability . . . Physical Properties . . .* will be mailed to you promptly. Write today for your copy.



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STEEL CORPORATION · PITTSBURGH



**Fig. 1:** P. T. Hall, rock preparation superintendent, stands on operator's platform for two 73-in. grinding mills. His hand is on whizzer speed control which varies fineness of grind

## Virginia-Carolina Steps Up Phosphate Mill Capacity

By C. V. O. HUGHES\*

### FINE GRINDING

... with four of the latest type roller mills and automatic controls has brought about lower costs and more flexibility in meeting specifications

**O**PERATING four Raymond highside roller mills, Virginia-Carolina Chemical Corp. can now handle a peak capacity of 1800 tons per day at the Nichols, Fla., phosphate rock processing center.

Two 73-in. mills, which replaced two older and smaller units in 1954, achieve a capacity of 31 t.p.h. when grinding to 60 percent through 200 mesh, the "standard" grind for phosphate rock that is to be acidulated. A 66-in. mill, installed in 1941, has been modernized to increase its capacity to 16 t.p.h. A fourth mill, 66-in. size, operates as part of V-C's concentrated superphosphate plant.

Rollers, bull ring, and plow points

must be in top condition to obtain peak capacity. As these parts wear, grinding capacity of the mills slowly decreases. How far capacity is allowed to decrease is a matter of operational choice in balancing lost time of overhaul against the performance gained by repairing.

At one time, V-C replaced rollers about every six months, and bull ring once a year. Now, in the 73-in. mills, rollers are generally replaced every eight to ten months. Since the bull ring is still renewed on the second roller replacement, its life is 16 to 20 months. Bull rings are machined down to true them up on the first roller replacement. (In actual practice, the original bull ring is replaced with a spare, and is then sent out for ma-

chining and placed back in stock.)

When allowed to run steadily for eight to ten months, the 73-in. mills' hourly capacity drops from 28 long tons to as low as 20 long tons. Renewing of rollers, bull ring, and plow points takes 16 working hours. Used rollers are discarded, plow points are built back up and returned to stock (new ones are rarely required). V-C believes one machining (i.e., two runs) is all the life that should be expected although some operators use two machinings (three runs).

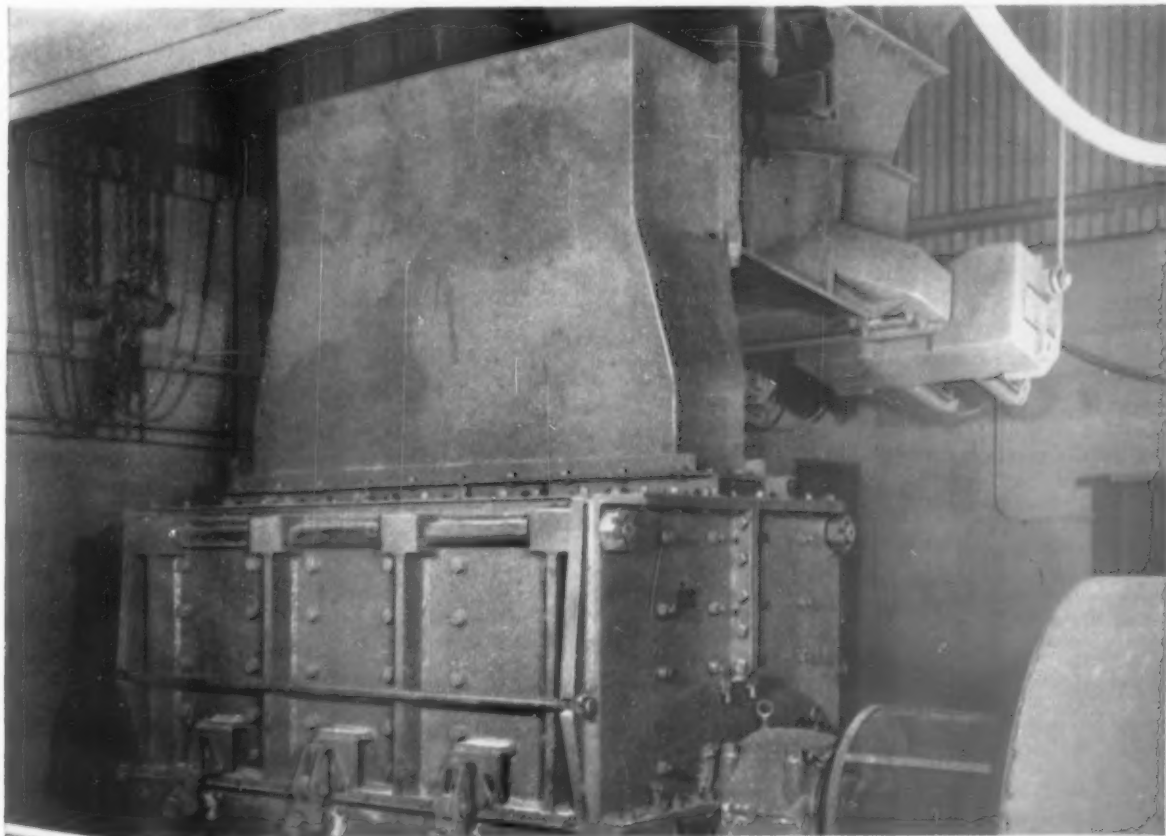
V-C's Florida Engineering dept., with D. W. Newell in charge, designed and constructed the installation featuring an operator's platform for all electric controls and indicators. The 9 ft. high platform puts the opera-

\*Assistant Department Manager, Virginia-Carolina Chemical Co.



*"We're very well pleased  
with our Jeffrey crusher"*

reports South Dakota State  
Cement Company



350 to 400 tons of limestone per hour are reduced by this Jeffrey crusher to  $\frac{3}{4}$ " x 0" size. The chief engineer for this plant says they are well pleased with this crusher and its Jeffrey feeder.

This reversible swing hammer crusher is the outgrowth of many years of experience in reducing cement rock and limestone to a product suitable for tertiary or fine grinding mills. Jeffrey engineers designed it to produce the most efficient product size for operation at peak capacity, with minimum upkeep and power usage.

Bulletin 868 describes this crusher. For a copy, or for help in solving any reduction problem, write The Jeffrey Manufacturing Company, Columbus 16, Ohio.

42" x 82" Jeffrey Type B  
Reversible Impact Swing  
Hammer Crusher mill at  
South Dakota State Cement  
plant, Rapid City, South  
Dakota. Crusher is fed by  
5' x 6' Jeffrey enclosed  
electric vibrating feeder.

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TRANSMISSION MACHINERY • CONTRACT MANUFACTURING



**JEFFREY**

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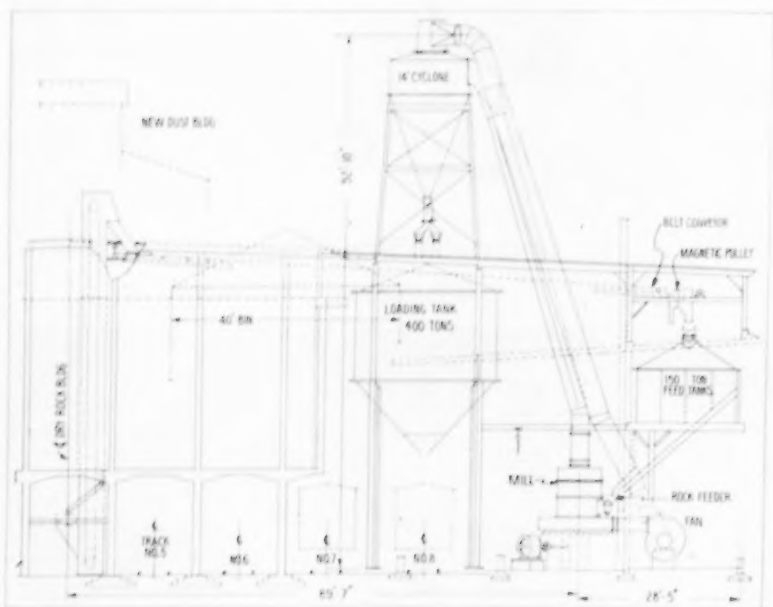


Fig. 2: Elevation details of entire grinding unit from feed bin through grinding mill and cyclone to feed tank and loading track

tor where he can easily reach whizzer speed controls for fineness of grain, check the feeders, inspect all key equipment, and make all necessary adjustments. The platform is both comfortable and safe to work on, and the operator can move easily around all sides of the mill.

Dry feed is brought to the 150-ton feed tanks by belt elevator and conveyor belts. Ground rock is air-conveyed above the roof of the building and collected in 14-ft. diameter cyclones. The collected ground rock is dropped by gravity, or conveyed by

Airslide, to one or more of five loading tanks. Four of these are 400-ton capacity; the fifth is 1400-ton capacity. Ground rock is usually loaded into covered hopper cars although some box cars are still used.

All electrical switch gear is housed in a separate room, on the side away from the carloading operations. Power enters at 4160 volts, into a GE indoor type 1200 amp. oil circuit breaker. Most of the power is distributed at 4160 volts, since the mill drive motors and fan drive motors operate at this

voltage. The reason for using 4160 volt motors is to make them interchangeable with 100-hp. and larger motors standard at V-C mines.

From the main oil circuit breaker, feeders go direct to each of the high voltage motor starter cubicles, and also to a Kuhlman 500 kv.-a, three phase, 4160/480 volt transformer. This transformer supplies low voltage auxiliary power through a Square D 750 amp. breaker to a Square D control center containing starters for auxiliary motors.

The 73-in. mills are driven by 450-hp., 4160 volt, 590 r.p.m. wound rotor motors. Speed is controlled by chromium steel grid resistors in rotor circuit. The 66-in. mill is driven by 250-hp., 4160 volt, 433 r.p.m. wound rotor motor. Five-step speed control was designed by V-C's electrical dept. Primary starter and secondary contactors are all remote-controlled, using a Modutrol motor, shaft and cams to position a mercury contact step controller. This requires 30 sec. to bring drive motors from standstill to full speed, or vice versa. (In emergency, of course, primary breaker can be opened instantly.)

Fan motors for 73-in. mills are 200-hp., 4160 volts, 1175 r.p.m. squirrel-cage. Fan motor for the 66-in. mill is 100-hp., 4160 volts, 1165 r.p.m. squirrel-cage. All of the fan motors are single-speed, line-start motors.

Each mill has two rock feeders, and each feeder is driven by a two-speed 1½-hp. motor. Each mill has a variable speed whizzer; the 73-in. mills have 15-hp. drives, and the 66-in. mill has a 10-hp. drive on the whizzer. The 73-in. mills also have 2-hp. drives for oil circulating pumps. All of these motors are 480 volts power supply. Other 480-volt motors drive the elevator and belt conveyors on the feed end, and the air pump for the Airslide on the product end.

The operator's control panel at each mill is 24-in. wide, 12-in. high, 10-in. deep. The front cover is hinged. On it are mounted all pushbuttons, control switches and indicating lights. The mill, its fan, its whizzer, its feeders, and its oil pump can all be started and stopped from this panel. (There are safety interlocks; for instance, the mill cannot be started until its oil pump is running.)

Indicator lights at each switch show whether equipment is running or off. For the two-speed feeder motors, indicator lights show whether feeder is at full speed, half speed or off. Feeders are automatically controlled by a pneumatic sense element that responds to air pressure drop across the mill. A selector switch can turn feeders

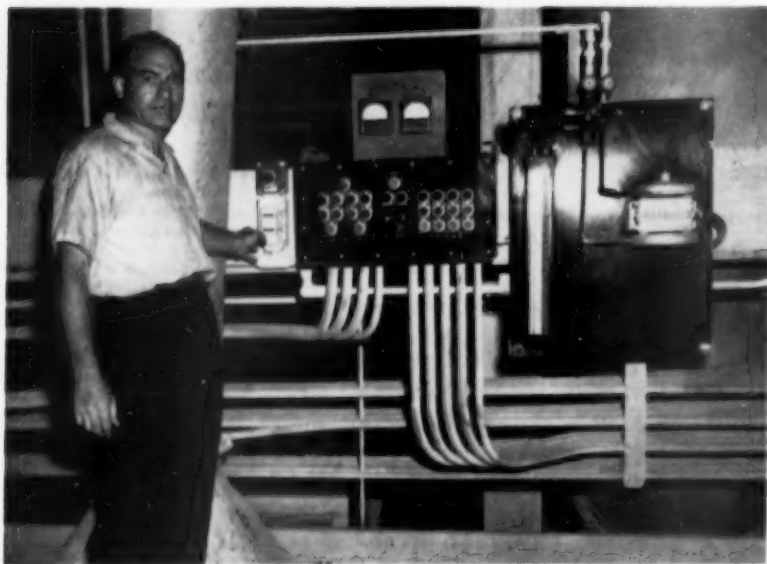
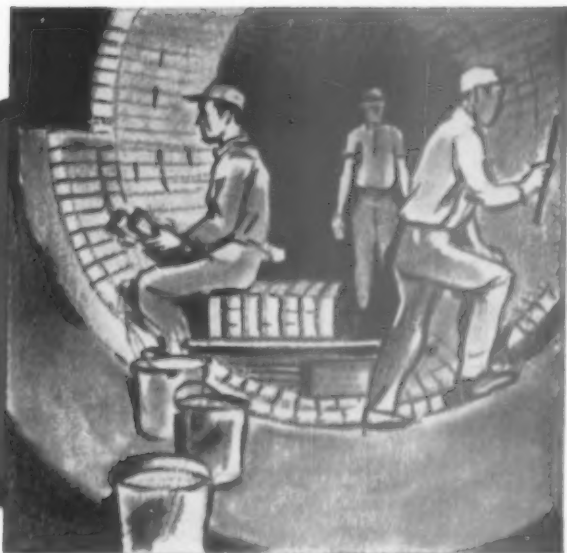


Fig. 3: Switch for the Airslide air pump is being touched by man's hand. This controls flow of ground rock from cyclone to product bins, above. To the right of this switch is main control panel for mill drive motor, fan, whizzer, feeders and oil pump



# MAGNECON

## IN YOUR ROTARY KILN

Magnecon performance in more than twenty countries throughout the world brands it as the outstanding product for such installations.

An informative booklet on "choosing a hot zone refractory to meet your kiln conditions" is available on request. Write today for your copy.



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because:

*It rapidly builds up a sound coating;*

*Maintains coating under severe operating conditions;*

*Resists chemical attack at the highest operating temperatures;*

*Withstands spalling under all operating conditions.*

Magnecon will meet all your problems under all conditions:

*Burning temperature—silica ratio uniformity  
of kiln feed analysis—frequency of mix changes—  
kiln shell condition—uniformity of load—  
frequency of shutdowns.*



### CANADIAN REFRACTORIES LIMITED

Canada Cement Building  
Montreal, Canada

Subsidiary of Harbison Walker Refractories Company, Pittsburg, Penn.  
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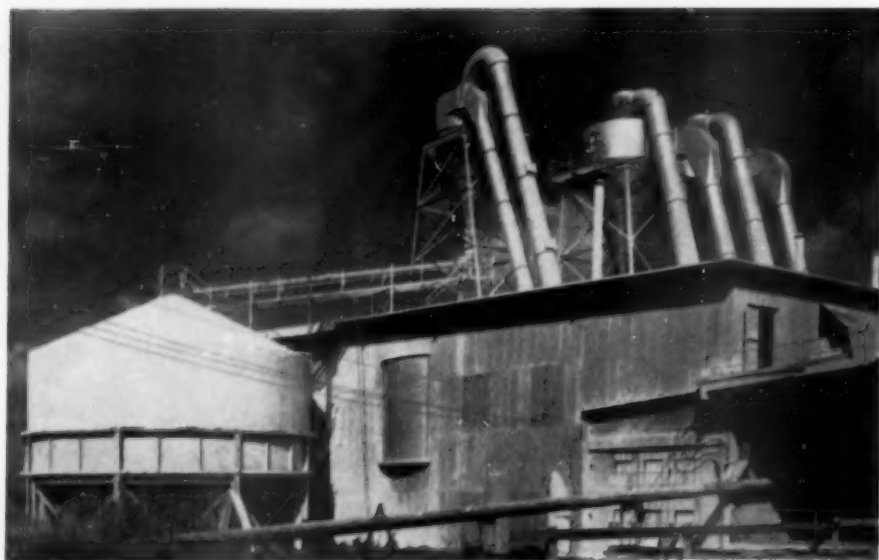


Fig. 4: Airslide conveys ground product from left cyclone (66-in. mill) to 1400-ton product bin, to the left. Two cyclones for the two 73-in. mills are to the right

from automatic to manual control, in the event of trouble with the automatic control.

Inside the control cabinet are terminal boards for terminating wiring from units in the switch room. On top of the control cabinet are two ammeters: one for the mill drive motor and one for the fan motor. In the switch room, there are 24-hr. clock-type recording ammeters for the mill drive motors.

The control cabinets and panels were designed and built in the V-C electric shop at Nichols, Fla., under the supervision of R. A. Hardy.

These mills generally grind either to the "standard" product—60 percent minimum through 200 mesh, or to the "fine" product—90 percent minimum through 100 mesh. The standard runs 80 to 85 percent through 100 mesh; the fine product runs 70 to 75 percent through 200 mesh. On the 325 mesh screen, the coarser standard grind is about 40 percent through 325; the fine grind is about 50 percent through 325.

The capacities given at the beginning of the article are for the coarser standard grind. When on the finer grind, the 73-in. mills' capacity drops to about 25 long t.p.h.; the 66-in. mill's capacity drops to about 12 long t.p.h. This is a little over ten percent drop in capacity when changing from the coarse to the fine grind.

Feed coarseness also affects capacity of the mills, although this effect is not always predictable. There are two general types of feed. The coarser is plus 14 mesh, minus five mesh. The finer feed is plus 150 mesh, minus 14 mesh. The coarser feed tends to grind more easily than the finer feed. At times, the two feeds seem to grind about equally well. At other times, the coarser feed

gives a capacity one or two t.p.h. higher than the finer feed. Feed is always at less than three percent moisture, and quite often is less than two percent moisture.

The cost per ton of roller mill grinding under these conditions may vary from as low as 40 to as high as 55¢ per ton. Variation will depend on these factors: (1) Cost of electric energy at point of use. (2) Labor rates in area. (3) Cost of total installation, affecting depreciation. (4) Percent of rated load kept on the mill on an annual average

basis, affecting all unit costs. (5) Size of plant, since same labor crew can handle many units side by side.

Changes in these factors, from plant to plant, may cause a significant change in grinding costs per ton. We can nevertheless explore probable unit costs in a general way. Power costs amount to about 17 to 25¢ per ton. Depreciation charges depend partly on how elaborate the installation is made, and partly on annual loading factor; they may fluctuate rather widely. It is probably best to allow 7 or 8¢ per

(Continued on page 196)

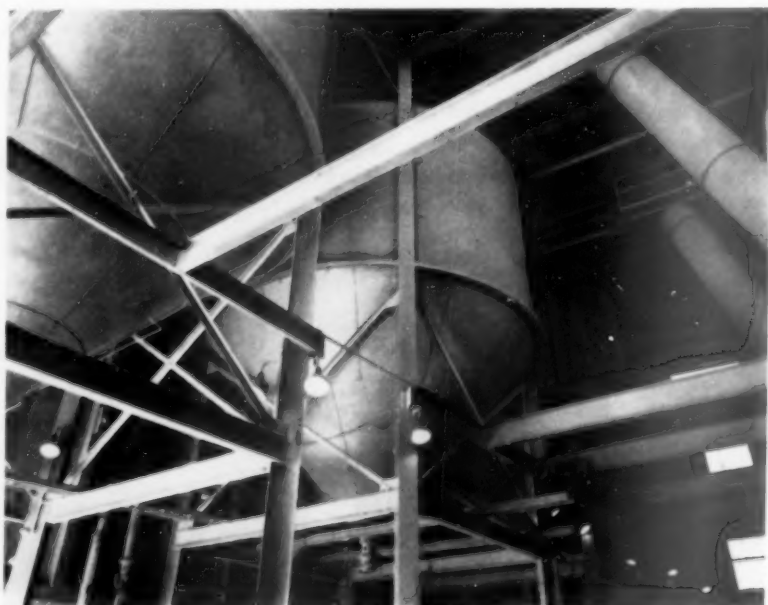


Fig. 5: Four 400-ton product bins inside mill building. There is room between the 66-in. mill and the two 73-in. mills to install one more grinding mill. At that time, one mill will be opposite each 400-ton tank. However, it is possible to put any mill's product into any tank by gravity or by Airslide



# WHERE EXPLOSIVES RESEARCH PAYS OFF



To blast 305,000,000 tons of stone and non-metal materials for America's ever-growing construction, road building, and steel industries requires more than 166,000,000 pounds of dynamite annually. Here, as illustrated above, is where explosives research pays off. Note the excellent fragmentation which minimizes secondary blasting . . . the low stone pile which increases and speeds up the production of the shovels.

Such results come not only from specially devel-

oped explosives and blasting supplies, but also by using the most modern blasting methods. Hercules' continuous research and extensive knowledge of field conditions are important to economical and efficient blasting in quarrying, coal mining, metal mining, and construction.

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## The man who named Tombstone, Arizona



THE SURPRISED government scout from Camp Huachuca reined his horse to a stop at the sight of Ed Schieffelin. And when Schieffelin admitted he was actually living and prospecting in Apache country, the scout warned him, "All you'll ever find'll be your tombstone."

But Schieffelin didn't scare easy. When he struck a silver lode in the desolate, dangerous hills of Arizona Territory, he called his first mine "Tombstone." And, unknowingly, he gave a name to a borning, brawling community soon to be notorious as one of frontier America's tough towns.

The Tombstone mine itself never amounted to anything. But Schieffelin just kept on prospecting—and within a few years, he turned out to be a millionaire. The hills he had risked his life in were practically made of silver.

Today's Ed Schieffelins are hunting uranium ore with Geiger counters, but their spirit is the same. And it is only part of the spirit of 165 million Americans who stand behind U. S. Series E Savings Bonds—who, by being the people they are, make these Bonds one of the finest investments in the entire world.

And, for an American, the very finest investment. Why not help your country—and, very importantly, yourself, by buying Bonds regularly? And hold on to them!

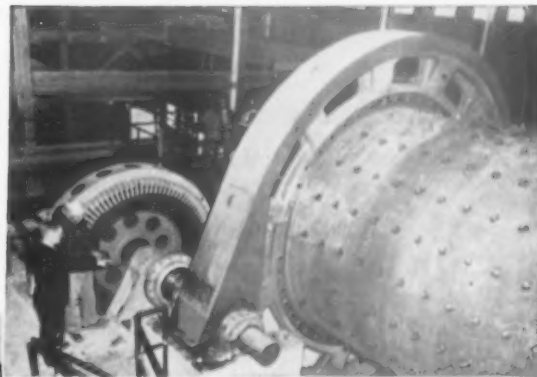
## Safe as America—U. S. Savings Bonds

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# FALK

Modern Gears for Modern Needs



ABOVE: A 10 1/2' x 12' ball mill with Falk helical gear and Steelflex coupling.



LEFT: 10' x 340' rotary kilns driven by Falk single helical gears, reducers and Steelflex couplings.

## Are your costly gears wearing out? Falk Helical Gears wear in!

Operators and engineers know that the action of ever-present abrasive particles on gear teeth is the arch-enemy of gear performance and gear life. They know that, when spur gears are used, abrasion tends to damage the tooth profile (thus lessening the smoothness of power transmission)—and ultimately destroy the gear teeth.

The sure way to reduce costly gear damage to an absolute minimum is to use Falk Precision-Hobbed Helical Gears. On these, the gear teeth are on a helix; this means that all phases of profile contact ("rolling" and "sliding") exist at the same instant. Pressure

and abrasive wear on "sliding" tooth surfaces are reduced, smooth transmission of power is assured, and the life of gears and connected machinery is extended. With several teeth sharing the load at all times, the teeth actually wear themselves in, instead of out!

You will find long-range economy in specifying "Gears by Falk" whenever you expand or revamp your facilities. Falk is the manufacturer best prepared to recommend and produce the exact helical gear—single or herringbone type—most suited to your application. Falk's leadership in precision gearing is recognized the world over.

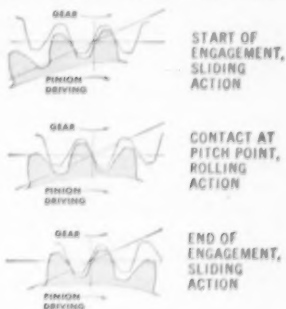
Consult the Falk representative nearest you—also, write for Report 6170, "Advantages of Helical Gearing."

THE FALK CORPORATION, 3001 WEST CANAL ST., MILWAUKEE 8, WISCONSIN

### GEAR FACTS FOR ENGINEERS

As each spur gear tooth picks up the full load, the relative motion between the driving and driven tooth is a sliding action. As rotation continues, this motion becomes rolling at the pitch point, changing to sliding action again as the tooth advances toward disengagement.

#### PHASES OF INVOLUTE GEAR TOOTH ACTION



Helical gears have several teeth sharing the load. Teeth are simultaneously in all phases of contact across profiles, with contact starting at the tip of the teeth and extending obliquely to the base, thus reducing unit pressures. Also, portions which are rolling will limit the pressure exerted on portions which are going through sliding.



When abrasive materials contaminate the lubricant and get into the gear mesh, the more one can limit pressures in sliding areas, the less grinding action (hence wearing away) there will be.

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ton. Labor amounts to about 8 to 11¢ per ton. Maintenance and repairs (including electrical and mechanical) stand about 8 or 9¢ per ton. All other charges combined may amount to one cent or less per ton.

Three men per shift—an operator, an oiler, and a feed tender—run Virginia-Carolina's three mills. If V-C were not grinding different grades (of phosphate content) to different finenesses, the feed tender might be replaced with automatic feed tank level controls. However, since we have constantly to insure filling the right feed tank with the right analysis of feed, we need someone to watch the routing of different grades of rock in the feed end.

Carloading is charged to shipping, not to grinding. A small dinky locomotive is used to spot empties at times on evening and night shifts. This can be replaced by remote-operated car-puller, provided a long enough straight track is built for car storage and in-line pulling. This is the type of installation choice that can raise depreciation charges, though it reduces labor charges.

**The roller mill is well suited to the custom grinding V-C needs.** The rock is of different grades and different grindability. The requirements of the customers as to fineness are variable. There are other grinding mills that may perform somewhat more cheaply on a particular rock at a particular grind. But the roller mill has certain advantages in its positive directing of feed by plows to the grinding zone, in its well-directed air sweep through ports, and above all, in its effective built-in whizzer separator. These features give a wide range of good performance over different feeds and different finenesses of grind.

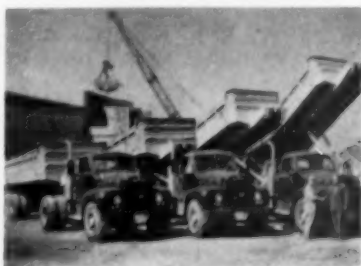
There are other types of air-swept mills in which the air does not so effectively winnow out the fines as they are made. But this difference may not be nearly so significant as the difference in the rejection of oversize by the whizzer separator. This separation is simple and yet very positive; it literally bats the oversize particles back into the mill.

Virginia-Carolina's grinding must achieve a product suitable for use in many different plants and with different specifications. It is essential that the mill be flexible in performance, and that it achieve changes in grind with minimum change in operational setup or in capacity. The roller mill (with whizzer) does this well. One simple control—whizzer speed—changes fineness of grind. The mill feed rate, of course, then changes automatically to maintain the same air

pressure drop. This simplicity and positiveness of control weighed heavily in the choice of mill for the type of rock and the type of variable grind that V-C operations handle.

### Uses Cable-Dump Trucks

ASPHALT STONE PRODUCTS, INC., Schenectady, N.Y., has added to its rolling equipment four Hobbs Schonrock Cable Dump trailers which operate on a cable-dump principle. This consists of a winch working with a cable and sheave assembly that pulls the rear wheels toward the truck, rais-



**Demonstrating maneuverability and method of operation** are four dump trailers, recently purchased by Asphalt Stone Products, Inc., of Schenectady, N.Y. Pictured in front of the units are, left, Guy Woodrow of Asphalt Stone and C. R. Miller of Transit Sales and Service, Inc., Hobbs distributor.

ing the trailer on lifting arms into dumping position. A unit also may be worked in reverse, with trailer brakes set and truck backing up, so that the load may be dumped into hopper, or other specified location.

### New Kiln Features Automatic Operation

CALAVERAS CEMENT CO., San Francisco, Calif., has placed in operation at its San Andreas, Calif., plant, a fifth kiln which commands attention not only because of its ability to boost annual production by 1,000,000 bbl., but also because it introduces specially-designed instruments that eliminate almost all of the human checks on operation which would normally be required. Engineering experts are said to regard it as a forerunner of automation in the cement industry.

William Wallace Mein, Jr., Calaveras president, said the project was rushed to help insure a steady supply of cement in northern and central California during the summer months when construction activity is high.

The new kiln, an 11-ft. 3-in. x 360-ft. unit, is operated automatically with push button controls. Included are elaborate warning signals. A complex of instruments analyze the exit gases and hold variations in operation down

to less than 1/2 of 1 percent. In addition to saving fuel, this innovation in kiln control will produce clinker of greater uniformity than has been attainable in the past. Automatic controls of the kiln were developed by Lewis A. Parsons, Calaveras consulting engineer, Mel Sutton, plant chemist, and Nels Swanson of Swanson Engineering Co., Inglewood, Calif.

The new kiln is the major item in a \$4 million plant expansion program that is increasing the company's production capacity by 30 percent. Other items in the program include new cement storage silos, slurry tanks, crusher, coolers, electric precipitator, multi-clone, raw and finish mills, materials handling equipment, and new shops, offices, and warehouse.

### Lease Limestone Claims

EDNA BAY PURE STONE CO., a Texas corporation, has completed negotiations with Aluminum Company of America for a long-term lease of Alcoa's Edna Bay, Alaska, limestone claims, located north of the International Boundary on the southern tip of Kosciusko Island. They will comprise the principal raw material source of a \$5 million lime plant to be installed by Edna Bay Pure Stone Co. in the Vancouver, Wash., area. The new firm is owned by Kent B. Diehl, Sr., Orange, Tex., and Cullen F. McDougal, Dallas.

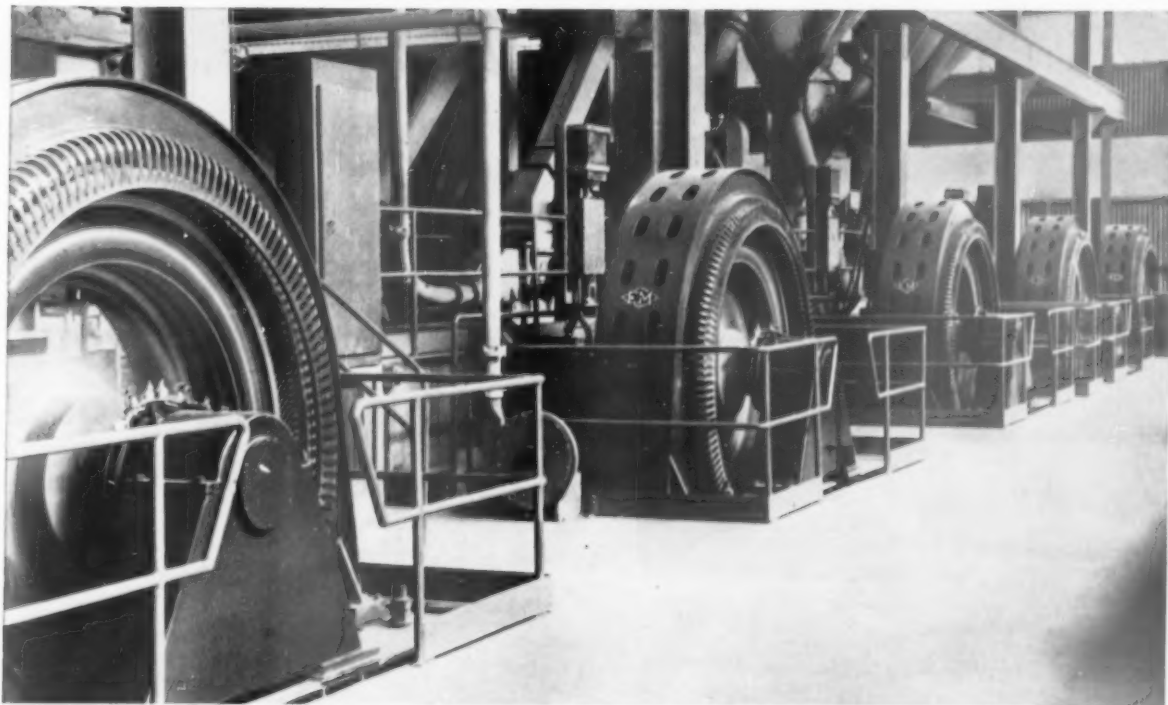
The company plans to quarry the chemical grade, high calcium limestone, and transport it in self-unloading Victory ships to the Vancouver processing plant. Lime produced from the stone will be used by the cement, paper, sugar beet and carbide industries on the West coast.

Construction of the plant, engineered for a daily capacity of 300 tons, will begin early in 1957. Located on the Columbia River, it will include a dock area.

Mr. Diehl, developer of the Edna Bay project, also is president of Texas Portland Cement Co., chief engineer and general manager of the Mississippi Valley Portland Cement Co., and general manager of Verde Valley Industries of Arizona. Mr. McDougal is chairman of the board of Texas Portland Cement Co.

A BILL HAS BEEN INTRODUCED into the House of Representatives by Representative Baker, (Rep., Tenn.), of the Committee on Ways and Means, which would allow a taxpayer who extracts sand or gravel from navigable waters to be treated as the owner of an economic interest in the deposits for percentage depletion purposes.





Notable for advancements in safety and simplicity is the new grinding mill department of Dragon Cement Company, Northampton, Pa. An excellent example of compactness, it is designed to be safely operated by four men. Rated capacity will be 2,400,000 bbl. of cement annually.

## How Dragon Cement Company drives mills efficiently and safely in new 4-man grinding mill department



### E-M "INCHER" CONTROL

This E-M-developed control provides quick, safe spotting of grinding mills. It turns mills literally inch-by-inch into desired position, all at the touch of a button. One E-M "Incher" Control can serve several motors, saving time and greatly increasing safety.

● Helping to achieve labor conservation, simplified maintenance, and safety in this new raw and finish grinding mill are five rugged E-M Synchronous Motors rated 1000 hp, 180 rpm, 2300 volts, "unity" power factor. Specifically, here's how these E-M Motors contribute to new standards of economical plant operation:

1. **HIGH EFFICIENCY** conversion of electric power to mechanical power, resulting in minimum electric power cost for operation of mills.
2. **POWER FACTOR CORRECTION** with "unity" power factor helps keep overall plant power factor high, further reducing power costs.
3. **DIRECT CONNECTION** of Motors to mills, thru rigid couplings for simplicity and minimum installation space.
4. **HEAVY-DUTY MILL-TYPE CONSTRUCTION**, including extra-heavy motor frame, high thermal capacity cage windings, dust resistant coil finish, and cool running sleeve-type bearings.

When you combine such motor features and top performance with E-M Hi-Fuse (high voltage, high interrupting capacity) Controls, you get the ultimate in protection as well. Complete safety for personnel and equipment, plus *extra safeguards* against short circuits and abnormal operating conditions. Your nearest E-M sales engineer can give you facts and data. Write the factory for E-M Publication No. 175 on large synchronous motors.

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ROCK PRODUCTS, August, 1956

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*When it's a tight spot you're in ...*

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**for design and  
construction of your  
plant expansion or a  
whole new plant**



At the Lone Star plant in Bonner Springs, Kansas, room to expand was at a premium. Construction and machinery installation was a "Bootstrap" operation. But when the plant was started, production was at top capacity in hours.



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NEW MILWAUKEE PLANT

**M**arquette Cement is pioneering a new era in cement plant design—the first U.S. installation of the Allis-Chalmers-Lepol (A-C-L) process—at a waterfront location in downtown Milwaukee. The plant is designed for unusually compact space requirements, low fuel consumption, and the extremely high degree of cleanliness necessary for its downtown location.

For this new process where maximum cleanliness is essential, the problem of final clean-up was assigned to the organization that has more know-how, more widespread experience in recovering dusts, fume and fly ash from industrial gases than has any other organization in the industry — Western Precipitation Corporation.

Moreover, for another large plant it is building at Cape Girardeau, Mo., Marquette has selected Western Precipitation COTTRELLS and MULTICLONES for the critical clean-up work there.

Whatever your recovery problem in controlling dust, fume, fly ash or other suspensions, bring it to the organization that has had years of first-hand field experience in all phases of such operations...electrical (COTTRELL Precipitator)...mechanical (MULTICLONE Collector)...combination electrical-mechanical (CMP)...and filter (DUALAIRE).

Western Precipitation can provide these installations on a complete "turnkey" basis—or can supply the basic equipment, as desired. This unequalled "know-how" is as close as your telephone in all of the nation's major industrial areas!



COTTRELL Electrical Precipitators  
MULTICLONE Mechanical Collectors  
CMP Combination Units  
DUALAIRE Reverse-Jet Filters  
HOLD-FITE Processors

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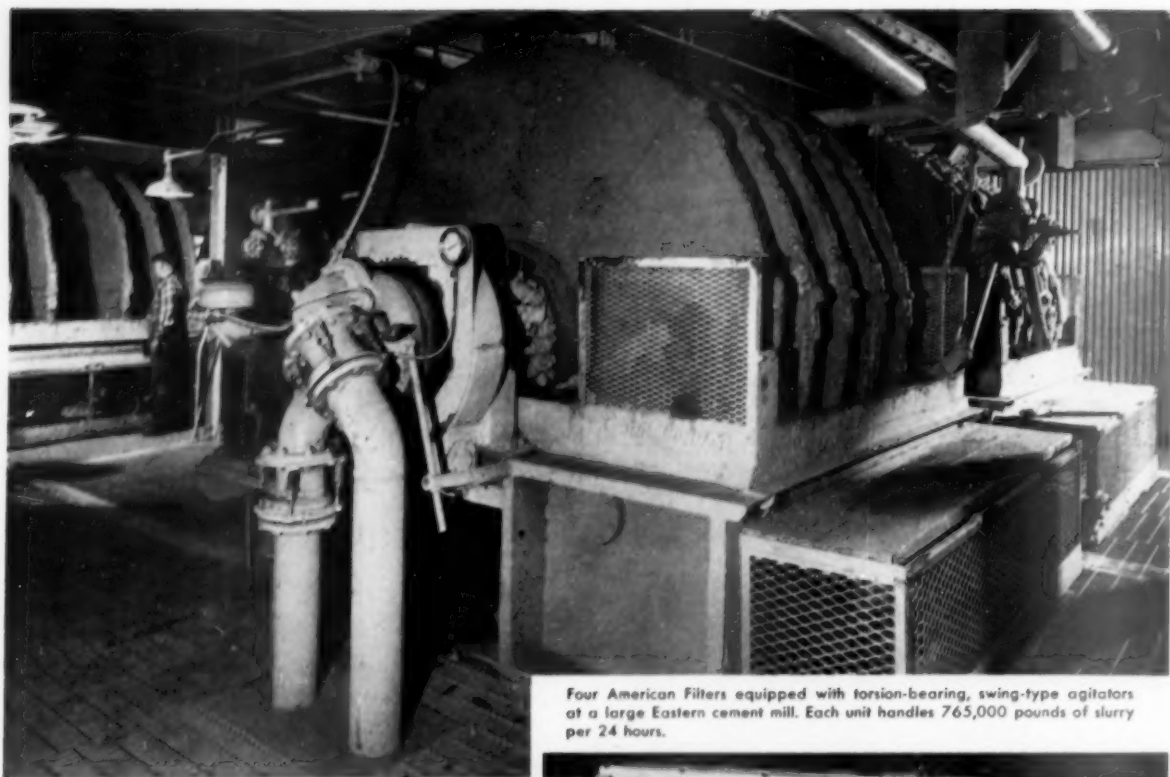
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Pittsburgh 22 • 3252 Peachtree Road N. E., Atlanta 5 • Hobart Building, San Francisco 4  
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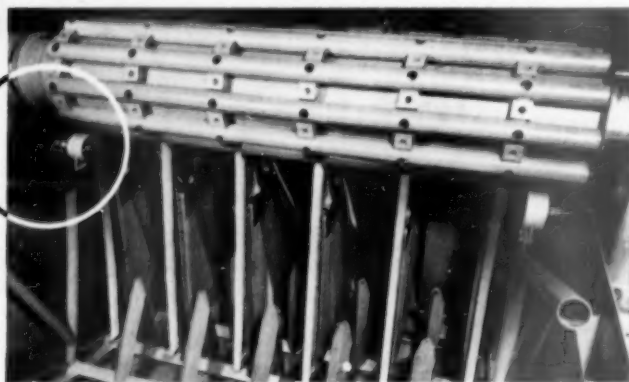
ROCK PRODUCTS, August, 1956

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Four American Filters equipped with torsion-bearing, swing-type agitators at a large Eastern cement mill. Each unit handles 765,000 pounds of slurry per 24 hours.

## New Swing-Type Agitator on **AMERICAN FILTER...**



Closeup of the new agitator installed in Filter Tank. Torsion bearings are at left and right just under the main shaft.

Latest development in continuous disc filters is a new swing-type agitator designed by Dorr-Oliver that completely eliminates troublesome stuffing boxes and assures uniform agitation from the bottom of the tank to the slurry surface. Here's how it works.

Vertical picket members are attached to the agitator. These pickets extend up between the filter discs and insure positive, uniform agitation throughout the feed slurry. Torsion bearings located on the inside of the tank walls

support the agitator. These bearings incorporate a special rubber compound, bonded to the bearing support and agitator shaft, that flexes as the shaft oscillates. It is impossible for slurry to enter the bearing.

This new development is typical of Dorr-Oliver's continuing search for improved techniques in wet processing. If you'd like more information on the American Filter with the new swing-type agitator, just drop a line to Dorr-Oliver Incorporated, Stamford, Connecticut.

American T.M. Reg. U. S. Patent Office



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# Review of Recent U.S. Patents On Non-Metallic Minerals

By OLIVER S. NORTH\*

2,747,331—Method of using **pumice**, **sand**, exfoliated **vermiculite**, and other suitable inert root-supporting media in hydroponic agriculture. (to A. A. Steiner. Assigned to de Nederlandse Centrale Organisatie Voor Toegepast Natuurwetenschappelijk Onderzoek)

2,747,734—Abradant materials are removed from between the laminae of exfoliated **vermiculite** particles by washing with an aqueous solution composed of hydrogen peroxide, ammonium hydroxide, and sodium hypochlorite. The cleaned product is useful for lubricating and paint-manufacturing purposes. (to M. F. Rose and J. E. A. Stone)

2,747,963—Acid-grade artificial **fluorspar** and rare earth oxides are recovered from ores containing mixtures of those minerals, by intergrinding with ammonium sulfate, heating, leaching, and treating with ammonium carbonate. (to A. M. Thomsen)

2,747,968—Elemental **sulfur** is recovered from waste gases containing sulfur by fixing with a solution of copper salt and silica-free **kaolin**, regeneration, and conversion of the sulfur dioxide by standard methods. (to P. G. M. A. Pigache)

2,747,994—Lightweight, porous, magnesia-cemented insulation products include as fillers **asbestos**, **bentonite**, **diatomite**, **kaolin**, and glass fibers. (to H. P. Hoopes. Assigned to Pahco Products, Inc.)

2,748,008—Porous calcium silicate products are made by mixing **lime** with **silica**, synthetic xonotolite, or **wollastonite** in the proper molecular proportions. (to G. L. Kalousek. Assigned to Owens-Illinois Co.)

2,748,090—Suitable carriers for a solid polymerization catalyst include **bentonite**, acid-treated **clays**, **diatomite**, and **fuller's earth**. (to C. H. Watkins. Assigned to Universal Oil products Co.)

2,748,935—A process for separating talcose impurities from **asbestos** fibers by washing the material with a non-acidic colloidal solution of a surface-active substance, such as alkali silicates, albumin, casein, etc., which causes the talc to lose its adhering

power and remain in suspension. (to K. Rescheneder. Assigned to Eternit-Werk Ludwig Hatschek)

2,748,938—**Spodumene** ores—especially those weathered or mixed with other materials—can be concentrated by moving the crushed ore through a flotation circuit containing a sulfonated oil collector. The **spodumene** is floated and nearly all impurities normally present in such ores are depressed. (to F. H. Bunge. Assigned to Armour & Co.)

2,748,939—**Phosphate** ores are concentrated by a reverse flotation process wherein sulfuric acid is not required to deaden negative-ion reagents, thus avoiding the further step of washing the acid. (to W. A. Hodges and J. E. Floyd. Assigned to Swift & Co.)

2,749,219—Calcium carbide is produced in a shaft furnace by burning with oxygen a charge of coke and **limestone**, withdrawing the liquid slag and adding calcareous material, and again firing. The step is repeated until the slag attains the desired quality. (to S. Koopal and J. H. C. Moison. Assigned to Stamicarbon, N. V.)

2,749,250—A barnacle- and tere-do-resistant composition utilizes an inert material having Mohs-scale hardness over 5; for example **roofing granules**, **feldspar**, or blasting **sand**, with a coal-tar enamel containing **talc**. (to J. C. Christensen and W. F. Fair, Jr. Assigned to Koppers Co., Inc.)

2,749,263—A method is described for producing **gypsum** wallboard having overlapped cover sheets with edges chamfered so that no line of longitudinal weakness is present in the finished board, thus protecting it from longitudinal as well as edge cracking. (to O. E. Gibson. Assigned to United States Gypsum Co.)

2,749,277—Among the materials used with a dextran in a face powder, or cosmetic preparation for coating legs, are **bentonite**, **talc**, and **whiting**. (to H. A. Toulmin, Jr. Assigned to The Commonwealth Engineering Co. of Ohio)

2,750,000—Method and apparatus for continuously separating **sulfur** from the discharge of a Frasch-process sulfur mine. (to R. L. Williams, J. E. Shaw, Jr., and V. H. Brogdon, Jr. Assigned to Freeport Sulfur Co.)

2,750,031—A method of packaging **gypsum** plasterboard units so that they are held firmly together, yet can be readily separated with common tools. Thin wire staples are used at critical points of the bundle. (to K. R. Eckrote and W. W. Tolley. Assigned to United States Gypsum Co.)

2,750,036—This patent describes improvements on the Crago process of **phosphate** concentration that make possible better recovery from a given feed and require lesser amounts of reagents. (to J. L. Hunter and H. W. Breathitt, Jr. Assigned to Minerals and Chemicals Corp. of America)

2,750,269—Rock **phosphate** and **lime** are mixed with manure and other waste or byproduct organic materials and the mixture allowed to age in windrows, in the open, with frequent turning for good aeration. When brittle or decomposed, the fine material is screened out and used as a compost for gardens, potted plants, etc. (to G. Klein)

2,750,270—Soluble phosphates are produced by fusing a **phosphate** rock, for example, **apatite**, reacting the fused material with aqueous ammonium carbonate, separating and evaporating the solution, and recycling the residue. Acid is not required. (to M. D. Barnes. Assigned to Monsanto Chemical Co.)

2,750,275—Elemental **sulfur** and metallic oxides or metals are produced from sulfide ores, for example, **pyrites**, by a partial-oxidation process. (to O. J. Parker)

2,750,280—A crushed slag composition of **fluorspar** and **lime** is added to molten steel to bring about rapid desulfurization. (to R. Perrin and J. Lamberton. Assigned to Societe d'Electro-Chimie d'Electro-Metallurgie et des Acieries Electriques d'Ugine)

2,750,322—A gasket for use in connection with the filling valves of bottle filling machines is made of buna and natural rubber, polystyrene, **talc**, **clay**, and other materials. (to G. B. Cook and W. C. Rainer. Assigned to Crown Cork & Seal Co. Inc.)

2,750,640—A portable apparatus for conditioning and distributing **sand**, especially foundry sand. (to G. M. Butzow)

2,750,647—An improved, inexpensive mold for use in the construction of a hollow **concrete** wall. The center mold is of paper board or cellulose fiber board, and can be left as an integral part of the finished wall. (to E. Krieg)

2,751,188—Ceramic machine parts having good strength and resistance to heat are produced from **bentonite**, **clay**, **magnesite**, and raw and calcined **steatite**. (to W. Rath. Assigned to

\*Copies of patents listed may be purchased at 25¢ each from the Commissioner of Patents, Department of Commerce, Washington 25, D. C.

(Continued on page 266)



# The Whole Construction Story wrapped up in one Gigantic Package!

## A.R.B.A. ROAD SHOW and CONVENTION

International Amphitheatre—Chicago

### The 10 Best Reasons Why You Should Not Miss The A.R.B.A. Road Show and Convention

1. First Road Show in nearly 10 years!
2. The best way to "catch-up" on latest advancements in equipment, materials and methods.
3. Helps you determine best buys in machinery through first-hand comparisons.
4. Gives you information you need to improve your operating efficiency.
5. Hear top-ranking specialists in all phases of highway, street and maintenance work.
6. Learn how latest Federal Government plans and regulations will affect YOU.
7. Meet leading Federal, State, County and Municipal authorities.
8. Discuss equipment and service needs with manufacturers and distributors.
9. Swap ideas with construction and maintenance experts from all over the world.
10. Renew old contacts . . . make new friends.

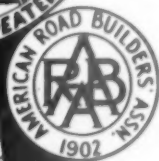
Almost 10 years since the last Road Show has seen vast changes—changing personnel in your organization—new people and expansion. Field operations cannot possibly permit the fullest study or comparison of equipment and the press of business reduces the opportunity for learning all there is to know of new methods.

The A. R. B. A. Road Show and Convention will bring you the whole construction story wrapped up in one package. 300,000 sq. ft. of equipment—over 1,000 pieces of machinery—down-to-earth discussions by leading construction authorities—a 6-day opportunity to "catch up" on all that's new in construction.

The tremendous immediate future of the industry warrants your planning to be there. Write for data on reservations. Ask to be put on the list for future information on the 1957 A. R. B. A. Road Show and Convention.

**MAKE YOUR  
PLANS**

1957 JANUARY 1957						
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		1	2	3	4	5
6	7	8	9	10	11	12
1957 FEBRUARY 1957						
S	M	T	W	T	F	S
3	14	15	1	2	3	
0	21	22	23			
28	29	30	31			



## AMERICAN ROAD BUILDERS' ASSOCIATION

World Center Building Washington 6, D. C.

Travels wherever you want it. Schramm Pneumatractor Rotadrill eliminates separate compressors and wagon drills in Nally & Boone Quarry at Greensburg, Ky. Mounted on a Schramm Heavy Pneumatractor, the Rotadrill has almost unbelievable maneuverability—goes almost anywhere. Sets up in minutes, too, and can drill a 4¼" hole or smaller to a depth of 500 feet with 10,000 pounds down pressure. Mast lowers for traveling between jobs.



#### KENTUCKY QUARRYMEN SET RECORD FOR ECONOMY

## Drill 830 feet in 4-day test at drilling cost of 4½¢ per ton

The figures at the right show what happened at the Nally & Boone Quarry, Greensburg, Ky., in a 4-day test of rotary rock-drilling with compressed air. Working in hard limestone, a Schramm Rotadrill mounted on Heavy Pneumatractor drilled 13 holes with a total footage of 830 feet. Approximate drilling cost per ton was 4½¢.

One reason for this record is Rotadrill's speed in making hole; increased penetration rates of 55% to 66% are reported in hard limestone areas. Another reason is the easy maneuverability of the self-propelled Pneumatractor; it goes almost anywhere under its own power. Still another is quick set-up; simply raise the mast,

level the rig, attach bit—in a matter of minutes.

One-man operation brings real economy to drilling with Rotadrill on Pneumatractor. So does the elimination of superstructure and labor of erection. Also, bit life is 35% to 300% longer than with other types of rigs. And, finally, Schramm Pneumatractor Rotadrills can operate 24 hours per day for months on end. For real speed and efficiency in drilling blast or toe holes, choose Schramm Rotadrill—mounted on truck or Pneumatractor.

Rotadrill is fast replacing wagon drills. Our Bulletin PR-55, "Rotadrill on Pneumatractor," shows why. Send for your copy today.



Convenient, simple one-man operation. Drilling controls are mounted in one bank, with pressure regulator and hydraulic gauge for controlling down feed. Separate valves control each outrigger, forward and reverse rotation motor, slow down feed, rapid down feed and breakout motor. Fast vertical action of rotative head serves as pipe hoist for adding pipe or pulling drill string. Outside spindle is flanged to take various drill pipe adaptors.

#### Look at the savings Nally & Boone got with their Pneumatractor Rotadrill.

13 holes, total footage	830 ft.
32 hours labor @ 1.25	\$40.00
11½ hours labor @ 1.87 (overtime)	21.50
43½ hours depreciation @ 1.50	65.25
190 gallons of gas @ .30	57.00
Bit cost	207.50
1 gallon of oil @ .40	1.60
<b>Total</b>	<b>\$392.85</b>
Cost per foot total elapsed time	.473
Drilling cost per ton—9 holes on 12' centers	4-4/10 cents
Drilling cost per ton—4 holes on 10' centers	4-7/10 cents

Your local Schramm Dealer is listed in the Yellow Pages of your telephone directory.

## Schramm, Inc.

MANUFACTURERS OF AIR COMPRESSORS

645 North Garfield Ave. West Chester, Pa.  
Enter 1093 on Reader Card

## Canada Cement's Largest Kiln

(Continued from page 106)

(at 250 deg. F.). Collected dust is returned to the clinker handling circuit.

An inclined Jeffrey pan conveyor (another is a standby) delivers the clinker to the crusher building, where a 4½-ft. standard Symons cone crusher, driven by a 125-hp. motor, reduces the material to minus ¾-in. Another pan conveyor transfers the crusher product to the storage hall. The clinker crusher building is vented to a Norblo 390A bag-type dust collector, which is served by a Norblo 70HS fan (40-hp. drive).

**Burning and related operations** are controlled from an elaborate centralized F.L.S. kiln control panel, which contains the usual array of recorders, indicating instruments, start-stop switches, signal lights, etc. The following variables are recorded and indicated on Bailey instruments (using circular charts): back end draft (maintained at about 4.5 in. w.g.); firing hood draft (-0.5 in. w.g.); oxygen and combustibles (O<sub>2</sub> kept at 2 percent, combustibles at 0 percent); burning zone temperature (2700 deg. F.), dust housing temperature (750 deg. F.), and temperature ahead of draft fans (600 deg. F.); and primary air temperature (125 deg. F.), secondary air temperature, taken above cooler feed end (1200 deg. F.), and oil temperature (225 deg. F.). Bailey recorders for kiln speed and oil flow and oil pressure are also available.

The panel also contains ammeter gauges for motors used in driving the kiln, cooler, and fans. There are also indicators for kiln speed and voltage

and louver damper position. A Hays draft gauge is used to indicate pressure in the cooler wind box (about 5 in. w.g.).

**Clinker is ground** by two 11 x 15-ft. Smidth ball mills, each of which is operated in closed circuit with two 14-ft. Sturtevant air separators. Three storage bins serve the two mills, the gypsum bin being common to each mill. Type 330 and 220 Jeffrey-Traylor Waytrols are used to deliver clinker and gypsum, respectively, in proper proportion, to a short inclined 24-in. belt conveyor feeding each mill. Generally 5 percent gypsum is used. The Waytrols, driven by variable speed motors through magnetic clutches, are electrically interlocked. They are controlled from a motor control panel on the mill floor; this panel contains signal lights indicating over-feed or under-feed conditions, rheostats for adjusting the feeder electric vibrators, totalizers, switches, and other controls. An important feature is the automatic warning system. If an over-feed or under-feed condition exists for a period of 15 seconds, an alarm sounds. If the condition is not corrected in the following 15 seconds, the feeders automatically stop.

The mills are driven at 18.4 r.p.m. by 1000-hp. 720 r.p.m. 80 percent p.f. Westinghouse synchronous motors through TS-1150 Symetro drives. E. M. reversible inching control is available. Each mill has double slide-shoe bearings at each end, and carries 59 tons of ¾—3-in. balls (the 3-in. balls are forged steel, the others quick-

quench cast steel). Transfer of all mill product to each pair of air separators is by means of a short FH Airslide, a bucket elevator, and screw conveyors. A single cross-screw conveyor serves each separator pair. Separator tails are returned to the mills by gravity, and the finish cement is transferred by 14-in. FH Airslides to the cement pump. This pump is an 8-in. Fuller-Kinyon unit, served by two 1005 c.f.m. C200 Fuller rotary air compressors (one standby); it delivers the product to the old stockhouses. Each grinding circuit is vented to Norblo 216A (two compartment) and 432A (four compartment) bag-type dust collectors.

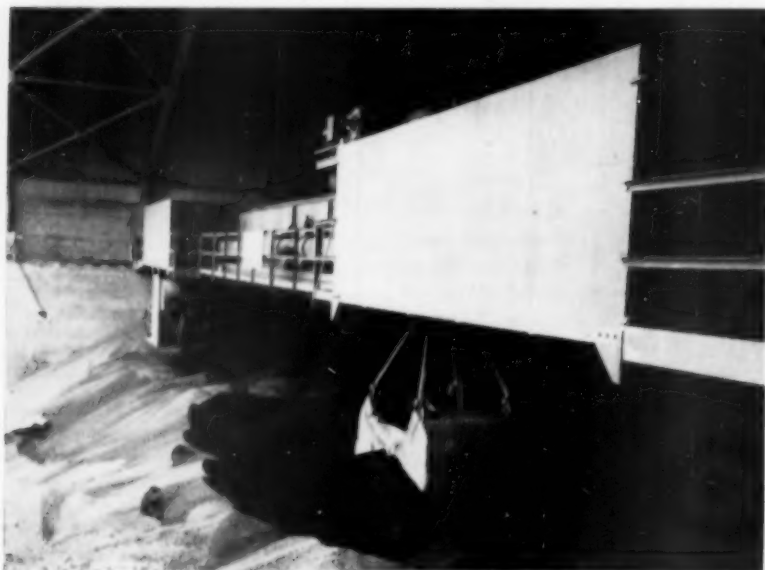
The new plant, built for all-weather operation, was designed by the Canada Cement Co. engineering staff. All buildings (except the storage hall) and outside conveyors are enclosed. The secondary crushing and screening buildings are of reinforced concrete-concrete block construction; all other buildings are enclosed with Trafford asbestos-cement tile. The storage hall is covered with corrugated steel sheeting; all other roofs are of precast or monolithic lightweight concrete. Passenger elevators are provided in the kiln building (kiln feed end), mill building, and the blending and mixing tanks.

C. W. Edmonds is superintendent of the Fort Whyte plant; J. M. Legate, assistant superintendent; S. Traves, chemist; and H. W. Burrows, plant engineer. A. Stewart is superintendent of the Steep Rock quarry.

Officers of Canada Cement Co., headquartered in Montreal, Que., are as follows: J. D. Johnson, chairman of the board; J. M. Breen, president and general manager; G. A. Grant, vice-president and general sales manager; R. S. Aiken, treasurer and controller; A. L. Campbell, assistant general sales manager; G. A. Luffman, secretary; G. L. Darlington, assistant secretary-treasurer; H. B. Howe, chief engineer; V. C. Hamilton, general superintendent; J. B. Hanley, assistant to general superintendent; T. J. Kennedy, superintendent of plants; A. S. Dies, technical supervisor of operations; and W. S. Weaver, chief chemist.


THE RURAL HILL SAND & GRAVEL CO., INC., has been incorporated at Rural Hill in Ellisburg, N. Y., with a capitalization of \$100,000. Charles J. Chafty and Ella M. Chafty of Adams, N. Y., and Glenn B. Parker of Belleville, N. Y., are incorporators.

WEDRON-SILICA SAND CO., north of Ottawa, Ill., has reported a fire which destroyed a warehouse. The loss was estimated at between \$35,000 and \$40,000.



A 20-ton, 120-ft. span crane, with 5-cu. yd. bucket handles clinker in storage





This dry sand abrasion test is one of many American Brake Shoe research evaluations which help you make the most of ABK Metal's characteristics in your specific applications.

# ABK<sup>®</sup>

## METAL

### research helps your fight against abrasion

In severe abrasive service—such as mill liners—three to four times the usual life can be expected with ABK Metal! Its extreme hardness (500 to 700 Brinell) and very high resistance to abrasion make it "good as new" when ordinary materials are worn out.

Because it lasts so much longer, ABK Metal costs far less per ton of material processed. ABK Metal liners reduce down-time and prevent costly losses of production. ABK Metal also slashes the labor expense of frequent liner replacement.

ABK Metal—a controlled structure nickel-chrome iron—is produced *only* by American Brake Shoe.

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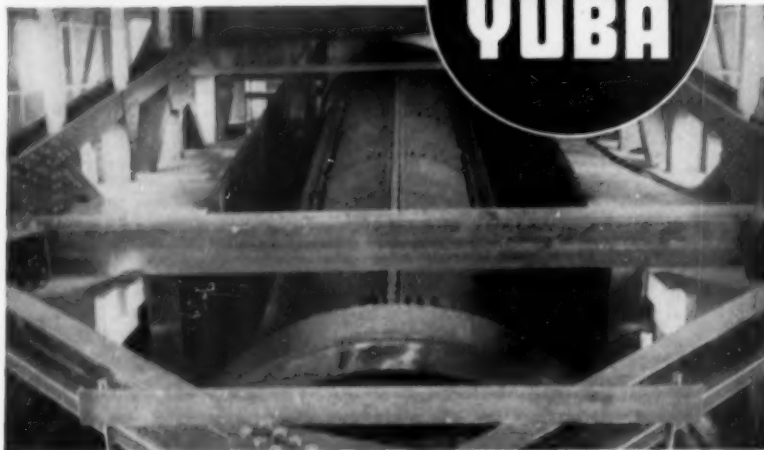
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# SCREENS or CONVEYORS

for dredge,  
plant, or mine...

CONSULT  
**YUBA**



YUBA-built revolving screen, 50' long, 9' diameter, weight about 65 tons.

You get long wear, reduce shutdowns for replacement when separating, scrubbing or sizing with YUBA Screens. They're made from Abrasion Resisting Steel plate, a high carbon, high manganese alloy steel with Brinnell hardness of 200 to 250. Taper drilled holes prevent clogging, can be small and closely spaced for screening monazite sands and other rare earths. For flat or revolving screens, in all thicknesses from 3/16" up; other dimensions as needed. Screens with cast manganese steel plates also can be furnished.

Conveying rock, sand and gravel has been part of YUBA's business ever since 1909. We've built hundreds of heavy-duty conveyors for use on dredges, in pits and at plants.

Bring your screen and conveyor problems to us for recommendations and estimates. No obligation. Wire, write or call TODAY.



YUBA-built conveyor stacker for conveying rock tailings from revolving screen on YUBA placer dredge to rock piles astern. 44" belt, 225' long.



## YUBA MANUFACTURING CO. 106

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AGENTS { GIME, DABBY & CO., LTD., SINGAPORE, KUALA LUMPUR, PENANG.  
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## RECENT PATENTS

(Continued from page 201)

Maschinenfabrik Augsburg-Nurnburg, A. G.)

2,751,276 — Small percentages of **barite** and **graphite** are among the ingredients used in a light-sealing adhesive tape that is particularly useful in the photographic industry. (to W. C. Eaton. Assigned to Eastman Kodak Co.)

2,751,308 — A dry powder paint composition includes **asbestos** short fibers to make the mixed paint bond better to **concrete**, cinder block, etc. Other ingredients are white **portland cement**, **lime**, and fine **sand**. (to A. Arrighini. Assigned to Rocwall Co.)

2,751,367, 2,751,368 — Moisture-resistant, friable, polyacrylic compositions for use in conditioning soils can be made from hydrolized polyacrylonitrile and one or more of a wide range of nonmetallic mineral powders, including **attapulgit**, **diatomite**, **limestone**, **montmorillonite**, expanded **perlite**, **pyrophyllite**, and **talc**. (to J. F. Yost and I. B. Frederick. Assigned to American Cyanamid Co.)

2,751,525 — A suitable ceramic sleeve for a permanent magnet includes among its ingredients **clay**, **feldspar**, **kaolin**, **magnesite**, **quartz**, and **steatite**. (to M. Hekelaar. Assigned to Hartford National Bank & Trust Co., as trustee)

## Slaking of High Calcium Lime

By H. O. ANDEREGG

H. HARTMANN AND W. WEGENER, using a calorimeter with very careful control of all conditions have found that no overburning of pure lime occurs at 1300 deg. C., although the start of the hydration may be slowed down with the lime burned at the higher temperature.

An iron oxide addition of 2.5 percent slowed down the hydration although 5 percent seemed to have no effect. A small addition of silica seemed to speed up the slaking reaction. An explanation was offered that the CaO set free as any tricalcium silicate present decomposes is very reactive. (Zement, Kalk-Gips, Vol. 7 No. 6, p. 229, 1954).

## Consider African Cement Industry

A CEMENT INDUSTRY is being considered for the African Gold Coast, based on limestone deposits at Bonnyere in Western Nzima. Minister of Trade, Aka Adjei announced that the deposits are sufficient to produce 5,000,000 tons of cement.



BEHIND **LIMA** QUALITY

## Quality-built for dependable, high-output stripping and loading... the big, rugged LIMA Type 2400

It takes a big, rugged machine like the Type 2400 to give you fast, dependable, high-output stripping and loading service. This heavy-duty 6 yd. shovel is quality-built by Lima to stay on the job, deliver peak operating performance on the tough assignments. It's easily convertible for dragline operation, too.

Air operated clutches make the Type 2400 easy to handle. Wide, long crawlers give it plenty of bearing area for stability and maneuverability on soft footing. Tandem mounted drums give maximum cable capacity. These plus Lima's quality "extras" (see right) have made the Type 2400 a hands-down favorite with users around the world. Get the full story on the quality-built Type 2400 today. See your nearby Lima distributor, or write Construction Equipment Division, Baldwin-Lima-Hamilton Corporation, Lima, Ohio.

**COMPARE QUALITY!** No other machine gives you as much as LIMA!

1. Piston-type dirt seal rings and retainers in crawler rollers.
2. Moving parts are flame or induction hardened for longer life.
3. Two-shoe swing and propel clutches; air control.
4. Anti-friction bearings at all important bearing points.
5. Big capacity drums and sheaves are easy on cables.
6. Propel and swing gears and power take-off are enclosed in a sealed oil bath.
7. Torque converter (standard equipment).
8. Wherever you are, you can depend on skilled service and nearby warehouse stocks of parts to keep your LIMA on the job continuously.

**COMPARE** and you'll specify LIMA for shovels (1½ yd. to 6 yds.), cranes (to 110 tons) and draglines (variable). Smaller capacities available on rubber.

DISTRIBUTORS IN PRINCIPAL CITIES OF THE WORLD

**LIMA** SHOVELS • CRANES • DRAGLINES • PULLSHOVELS

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CONSTRUCTION EQUIPMENT DIVISION — LIMA WORKS



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Some of the 25 Sly Dust Filters at Peerless Cement Corp., Detroit.

## Peerless Performance at PEERLESS CEMENT

**Complete reclamation of cement dust . . . clean, dust-free plant . . . important operating economies.** These are three reasons why Peerless Cement Corp. uses Sly Dust Filters — and has done so since 1924. The reorders are justified by Sly performance. Today, in its Detroit plant, Peerless Cement has 25 Sly Filters in operation — actually 349 lineal feet of filter.

Because of the diversified Sly line, Peerless has the exact filter necessary for each specific operation. Expert filter design and construction mean **peerless** performance at every dust control point — with no appreciable maintenance.

Like Peerless Cement Corp., hundreds of cement plants choose Sly Dust Filters. They offer important advantages in greater filtering capacity, easier bag replacement, automatic control, space-saving installation, and other features that mean low-cost operation.

Sly's 82 years of dust control leadership are reflected by the experienced Sly engineer in your area. He will be glad to discuss your dust control problems with you. For immediate information, write for helpful, free bulletins.

### SLY LINE-UP AT PEERLESS CEMENT

**FINISH MILL VENTILATION**—3 Dyna-clones, 3 Automatic-Continuous Filters.

**PACKHOUSE VENTILATION**—5 Standard Filters, 1 UNIT Filter.

**CEMENT SILO VENTILATION**—4 Continuous-Automatic UNIT Filters.

**BULK TRUCK LOADING**—6 UNIT Filters.

**JUNCTION HOUSE VENTILATION**—(Belt Conveyor Transfer Point)—1ECONOMY Filter.

**PRIMARY GRINDING MILLS' VENTILATION**—1 Automatic-Continuous Filter.

**LABORATORY GRINDING EQUIPMENT VENTILATION**—1 UNIT Filter.

*Designers and Manufacturers of: Dust Control Systems,  
Blast Cleaning Equipment,  
Tumbling Mills, Industrial Ovens.*

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### P.C.A. Issues Bulletins

PORTLAND CEMENT ASSOCIATION, Chicago, Ill. has announced Research Department Bulletins 65, 66 and 67. Bulletin 65 contains two papers on "The Stoichiometry of the Hydration of Tricalcium Silicate at Room Temperature," published in *The Journal of Physical Chemistry*, January, 1956. The first of these papers deals with hydration in a ball mill; the second, with hydration in paste form. Authors are Stephen Brunauer, L. E. Cope-land, and R. H. Bragg.

Bulletin 66, "Effect of Aggregate on Shrinkage of Concrete and Hypothesis Concerning Shrinkage", is by Gerald Pickett. This paper appeared in *Journal of the American Concrete Institute*, January, 1956, and grew out of work done in the P.C.A. laboratories when Dr. Pickett developed a theory pertaining to the role played by aggregate in the shrinkage of concrete.

Research Department Bulletin 67 is titled "Observations on the Resistance of Concrete to Freezing and Thawing". Hubert Woods is the author. Included as part of the bulletin is a discussion of the paper by J. E. Backstrom and R. W. Burrows, U. S. Bureau of Reclamation. General conclusions are drawn from a survey of recent research on the resistance of concrete to freezing and thawing.

### Iowa Freight Rates Stable

FREIGHT RATES IN IOWA will remain the same on many rock products, despite the petition by the railroads for a 6-percent increase in intrastate rates. Though allowing some increases, the Iowa Commerce Commission denied increases for agricultural lime, sand (other than silica or commercial), gravel, stone and limestone—broken, crushed, ground or pulverized—stone rip rap and gypsum rock. Fred E. Bellamy of Concrete Materials and Construction Co., Cedar Rapids, Iowa, appeared as a witness in protest of any increases in the freight rates on these commodities.

THE McCLEAN SAND AND GRAVEL PLANT, near Tuscarawas, in Tuscarawas County, Ohio, has been purchased by Jack Lodge of Cadiz, Ohio, and Carl Stewart of Jewett, Ohio. The operation will utilize a dragline and loader along the Tuscarawas River.

ROGUE RIVER SAND AND GRAVEL Co., Grants Pass, Ore., has been purchased by Martin Kincheloe of Myrtle Point, Ore., from Norman Atherton, former owner. New equipment has been added at the plant, and expansion is planned.



**AMSCO PUMP APPLICATION FILE**

**at: PACIFIC PEBBLES, INC.**  
PACIFIC, MISSOURI



**"We've used our AMSCO® pump since 1947 ...  
no major breakdowns experienced yet"**



Pacific Pebbles, Inc., have been operating their 12" Amsco pump continuously since its installation in 1947. The pump operates on a 30-foot pipeline with a 30-foot lift. According to Mr. C. H. Baker, plant superintendent, this Amsco pump has operated with a minimum of maintenance and no major breakdowns during that period.

Mr. Baker estimates that the shell had an average life of 12 to 16 months and the impeller 6 to 10 months. Pacific Pebbles uses Amsco pipeline fittings and welds to build up the shell.

Mr. Baker states, "In over 25 years of using Amsco pumps, I have been more than pleased with their good service and small maintenance . . . which accounts for the no-major-breakdown record that I am proud of."

**QUICK FACTS ABOUT AMSCO PUMPS**

Whether your dredging operation is large or small, you can get an Amsco Dredge Pump to handle the job. Standard sizes range from 6" to 20" discharge openings. Larger sizes are also available. An Amsco Pump Engineer will be glad to discuss your requirements, or write for Bulletin 1052P, giving full information and specifications on the Amsco line.



# AMSCO

American Manganese Steel Division • Chicago Heights, Ill.

OTHER PLANTS IN: DENVER, LOS ANGELES, NEW CASTLE, DEL., OAKLAND, CAL., ST. LOUIS, JOLIETTE, QUEBEC

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ROCK PRODUCTS, August, 1956

209



# NEW MANUAL

## on heavy media SPIRAL SEPARATORS AND DENSIFIERS



Experimentation on use of the Akins Spiral Classifier in making a sink and float separation was first started in 1938. In 1944 the first commercial 78" Akins Separator was placed in successful operation by one of the large iron mining companies. Since then there have been many developments and refinements, mechanically and metallurgically, in the Akins Separator and the HMS process. This new manual is a complete presentation of these developments and includes the latest data on heavy media spiral separators and densifiers...

- development of spiral HMS separators
- discussion of metallurgical and mechanical operation of spiral separators
- handling of middlings
- how the Akins makes a 3-product separation with one medium circuit
- operating data showing actual results
- purpose of the densifier and how it works
- flowsheets
- capacities and engineering data on Akins Separators and Densifiers
- operating and control instructions

### PILOT PLANT TESTING SERVICE AVAILABLE

CIW has a 12" Akins Separator at the Colorado School of Mines Research Foundation which is available for conducting pilot tests.

**For a copy of MANUAL 56 just write to**

**Akins—the ORIGINAL spiral type classifier.**

**COLORADO IRON WORKS CO.**

**1624 17th Street • Denver 2, Colorado**

**AKINS CLASSIFIERS • SKINNER ROASTERS • LOWDEN DRYERS**

*Sales Agents and Licensed Manufacturers in Foreign Countries*

A SUBSIDIARY OF THE MINE & SMELTER SUPPLY CO.  
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## LABOR RELATIONS

(Continued from page 21)

### Discussion

"There is no question that the discharge penalty imposed on O. was based on the taking of company material out of the plant and not on his shortcomings in job performance relative to the extension of the ground cable. After all, the foreman who was on the scene when he assigned O. to the burning job and who had an opportunity to observe the manner in which O. was proceeding to lengthen the ground wire neither made any objection to the technique employed nor raised any question as to how and where O. may have obtained the solder and the coupling lugs being utilized. Certainly, the foreman saw nothing wrong in the use that was made of those items, and he did not complain about O.'s failure to avail himself of the accepted procedures for requisitioning these materials. If he had considered O.'s actions improper, that was the time to call attention to the infraction and had any discipline been assessed on that score the same would have been instigated by the foreman.

"So the whole extent of the misdeed boils down to the nature of the company material that O. carried in his pockets and that the particular circumstances surrounding his actions in that regard. It is to that subject that attention is now directed.

"Standing uncontradicted is O.'s testimony to the effect that it was his consistent past practice to carry out sundry articles of job equipment and bring them back to the plant the next morning. The tip cleaners, the lugs, the strip solder, and the burner tips are all small items that readily fit in the clothing pockets, and are the type of job tools that welders would conceivably carry on their person. Because he didn't change into street clothes, he didn't tarry in the locker room when he finished his day's work—he simply picked up his coat and headed for the gates—further, O.'s custom of carrying around a tobacco bag stuffed with paper money lends credence to the idea that although the retaining of these objects might be characterized as naive, it was nevertheless an entirely innocent act. Taking the whole picture into account, there is no indication of an intent on O.'s part to steal or to convert to his own use property that did not belong to him.

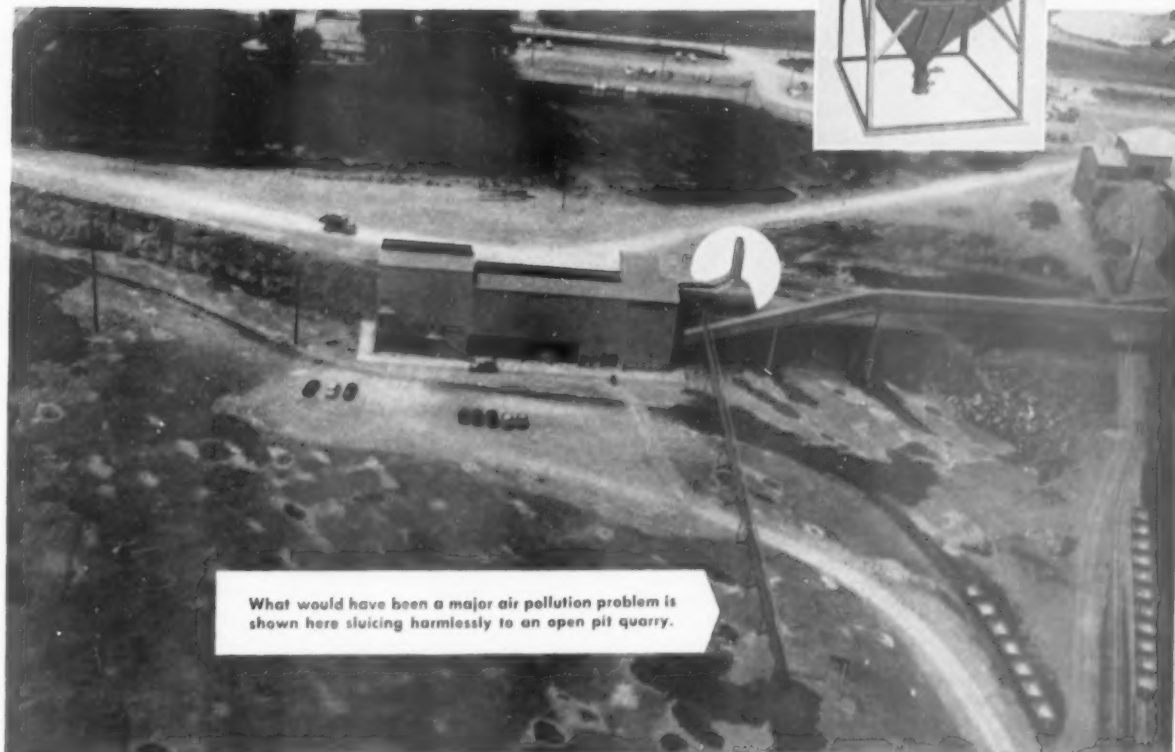
"Of course, had there been a clear showing of an attempted theft, the value of the items involved would not be a significant factor. Even if it were only a screw driver that the employee attempted to appropriate he would be

# ROTO-CLONES

## keep Monarch Cement drying operations dust-free



TYPE N  
ROTO-CLONE  
cutaway shows  
dual impellers  
and distinctive  
water curtains  
created by air  
flow.



What would have been a major air pollution problem is shown here sluicing harmlessly to an open pit quarry.

### Air pollution problems sluiced harmlessly away

Monarch Cement Company, Humboldt, Kansas, realized that dry centrifugal collectors alone couldn't remove enough fine dust from shale tailings dryer stack gases to control air pollution. They nipped a public nuisance in the bud by installing secondary collectors.

The "clean-up" collection job is done by two wet-collecting Type N ROTO-CLONES (50,000 cfm each). They transform exhausted dust into a harm-

less sludge that is drained into a sluice line flowing into a large open pit quarry.

AAF's Type N ROTO-CLONE could help you in the same way. Its cleaning efficiency is exceptionally high because of the combined action of centrifugal force and the thorough intermixing of water and dust-laden air. For complete information, call your local AAF representative, or write direct for Type N Bulletin No. 107.



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AAF Dust  
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## 720 TONS... AN HOUR'S HAUL WITH THIS SAUERMAN TOWER EXCAVATOR



Pioneer's giant excavator is the largest power scraper installation in the sand and gravel industry.

Pioneer Sand and Gravel Co., Seattle, Wash., needs a huge flow of material to supply its ready-mix plants and barges. They're getting it with a 12-cu. yd. Crescent Scraper.

The Crescent handles 480 yds. or 720 tons per hr. over an average haul from 300 to 350 ft. It operates along a 675-ft. span between movable head and tail towers located at the base and top of the 240-ft. high bank.

In addition to high rate of delivery, adoption of the Sauerman Method provides two other advantages over the 5-cu. yd. power shovel that formerly operated off the "toe" of the bank. These are: (1) material can now be taken from anywhere on the bank for blending and selection of gravel, and (2) material can be moved down the slope with no danger of cave-ins.

The tower excavator at Pioneer is mounted on portable towers and engineered by Sauerman for economical excavation in this type of deposit. This same digging tool... the Crescent scraper... can be engineered to your operation to give you equivalent high production at low cost.

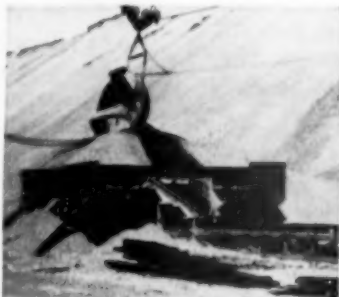
Sauerman Scrapers range from  $\frac{1}{2}$  cu. yds. up to 18 cu. yds.

Because in most cases it is cheaper to drag material than it is to lift and transport it, they give you the lowest cost per cu. yd. handled.

Contact us for information and specific recommendations. Ask for field reports and Catalog A.



This view gives some conception of the height and steepness of the bank on which the Crescent works.



The Crescent delivers to a portable field hopper from which belt conveyors transport the material to the plant.

vulnerable to discharge. But here, the withdrawal of these objects with full expectation that they would be brought back on the next tour of duty negatives the concept that this was an effort to deprive management of its property.

"Indeed, O.'s failure to obtain a pass covering these items was in disregard of company rules and regulations. To that extent he was off-base and properly subject to a measure of disciplinary action. But a one-week layoff would be the maximum penalty to apply in a situation of this kind. Accordingly, it must be concluded that the punishment inflicted was unduly severe.

"In considering all of the facts and circumstances in this case, and pursuant to the authority granted the arbitrator in Section 7, Paragraph 'D', it is deemed fitting to treat O.'s earnings in outside employment as a proper offset to the company's back pay obligation as hereinafter set forth.

### Award

"1. That under the provisions of the labor agreement dated July 28, 1954 as amended, the discharge of J. O. was not for proper cause. 2. That the company shall forthwith reinstate J. O. to his former job with seniority unimpaired and with back pay for all straight time hours lost by him for the period from Feb. 2, 1956, to the date of his reinstatement less any and all earnings received by J. O. in other employment during the period for which back pay accrues to him under the terms of this award."

### Ike's HIGHWAY PROGRAM

(Continued from page 89)

With the federal government assuming increasing responsibility for the Interstate System, corresponding amounts of state funds will be released for other roads. In this way it is hoped the entire network of Federal-aid highways and all other of the nation's roads will benefit from the plan.

The new highway legislation represents an enormous enlargement of the federal contribution to roadbuilding. But it does **not** mean an enlargement of federal authority. The BPR does not exercise authority over any highway department or the actions of any state. The states determine the projects for construction. Federal-aid assures that major highway projects will be built to high standards of both design and construction. However, if the BPR should react adversely to a particular state road building plan, the state can build the road without Federal-aid.

Reaction of the states has been good. Typical of gubernatorial com-

(Continued on page 214)

# SAUERMAN

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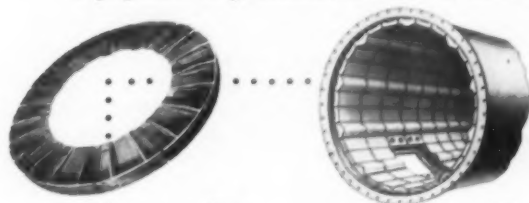
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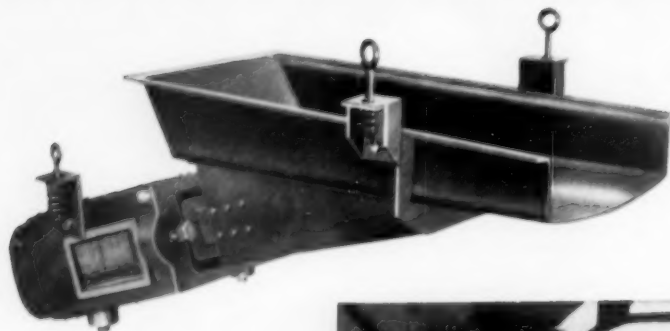
ROCK PRODUCTS, August, 1956

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S-460

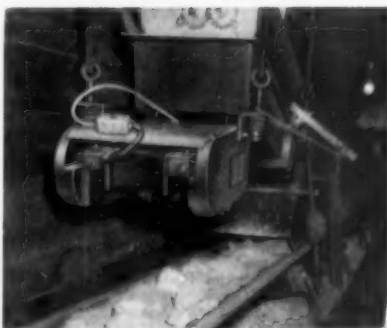
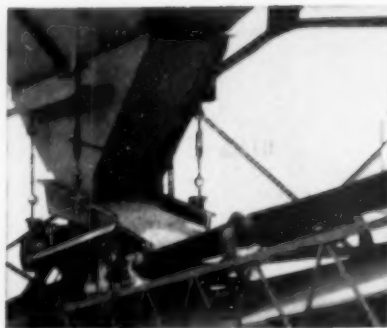
213

# SYNTRON Vibra-Flow VIBRATORY FEEDERS



## Low Cost Production and Dependability

SYNTRON Electromagnetic Feeders provide an efficient, low cost method of handling bulk materials in pits, mines and quarries. Easy regulation of material flow — dry or damp, — coarse lumps or fine powders from a few pounds to hundreds of tons per hour — to crushers, ball mills, screens and washers. Available in flat pan or tubular trough models.



### Other SYNTRON Equipment

of proven dependable Quality

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ments following passage of the new road legislation were these:

Gov. William Stratton, Illinois: "I don't consider the program enough, but it can go a long way toward solving many problems."

Gov. Goodwin Knight, California: "The highway bill will move up California's program ten years."

Gov. Leroy Collins, Florida: "This bill should go a long way toward solving our problems."

Gov. George Leader, Pennsylvania: "Additional federal money would be a welcome supplement to our program but would not meet by itself the state's increasing need for roads and their repair."

All of which indicates that the Federal program is sparking a great new era of roadbuilding in which the states will take a very large part on their own.

There's another challenge to be met in this national highway program—the challenge of permanency. The major highways to be built in this upcoming decade of roadbuilding must be designed to last a long, long time and built so they will not drain off dollars for maintenance that otherwise could be used for new construction. The engineering profession has the responsibility of designing long life into these new roads and seeing to it that they are constructed to these standards. There must be no skimping in this program that is so vital to every American citizen.

## CEMENT INDUSTRY EXPANDS

(Continued from page 77)

to happen in our region. At the extremes, there are plants right now that are operating only part time; then there are areas where cement is really in acute short supply. Expansion can be considered logically only in the light of such regional situations. Even the Eisenhower highway program will have a vastly different effect on differing regions of the country."

A vice-president for sales said that "very little can be done" about large and unusual one-shot demands for cement. "When a project like a dam is underway," he explained, "there inevitably will be a temporary shortage of cement in that area."

In the ultra-conservative group, "over-expansion" is the catch phrase, and most of the advocates here hearken back to the 30's when "we were burned once; we'll think a long time before we get burned again by over expansion."

One small company president, who takes a dim view of further expansion, pointed out that "we're talking immense sums of money when we talk expansion. We can't be precipitate about

# 510,000 lbs. of Du Pont blasting agents used in one of the largest vertical hole blasts ever fired!

1¼ MILLION TONS OF LIMESTONE BROKEN AT DOLESE BROS. CO. QUARRY, RICHARDS SPUR, OKLA.



**1.** Loaders lower Du Pont "Nitramon"® into holes. Free-running Pelletol No. 1 will be poured around the charge to give maximum energy at the bottom of hole.



**2.** Before the blast, two hills of limestone roll away from each other. A sinking shot, 100' x 1000', will take place across the saddle between the two hills.



**3.** Mammoth blast blossoms skyward. Powerful Du Pont charge was loaded in 208 holes on 25' x 25' pattern. Hole depth averaged 90', varied from 50' to 110'.



**4.** Result of the record-making blast can be seen against the horizon. The gap between the two hills has been filled with a swell of well-broken limestone.



**5.** View of about half of the 1000' blast. Du Pont MS-9 Connectors were used to delay each hole, reduce vibration and control the direction of the throw.



**6.** Close-up of the blasted stone shows the excellent fragmentation produced by the Du Pont Blasting Team. Easy loading—and another fine job done!

**GREATER SAFETY** is the added premium you receive from the Du Pont Blasting Team. "Nitramon"—even with its powerful spreading action—is the safest blasting agent known. It is unaffected by flame, friction, ordinary caps or rifle bullets. MS Connectors increase safety by keeping caps off the firing line until you're ready to shoot! For further information, write E. I. du Pont de Nemours & Co. (Inc.), Explosives Department, Wilmington 98, Delaware.

## DU PONT BLASTING AGENTS

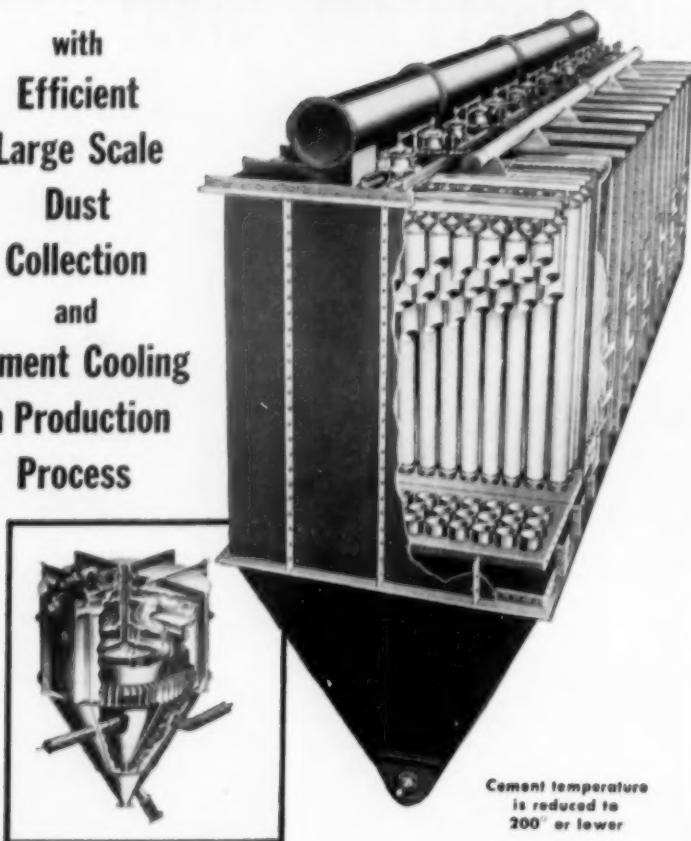
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# Norblo serves the Rock Products Industries well—

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**Efficient  
Large Scale  
Dust  
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Cement temperature  
is reduced to  
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Norblo's Cement Air Cooler and Dust Collection System (patented) combines two separate functions necessary for modern cement manufacture in one unit. The system cools both fines and tailings—eliminates higher temperatures that damage the finished product—and keeps temperatures inside the mill at more comfortable levels. Norblo Automatic Bag Type Dust Arresters with cyclic bag cleaning provide maximum efficiency of collection with low maintenance and operating cost. Remarkable results are achieved today in hundreds of American and foreign mills.

Norblo engineers have wide experience in the cement field and will give you a dependable survey and estimate on adapting Norblo cooling to your present equipment and layout. Write for Norblo Cement Air Cooler Bulletin.

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risking all we've gained in further expansion that might back up on us."

Another small company executive put it more bluntly when he said: "We have no intention of being stampeded by these spotty shortages. There is a real and immediate danger of reckless over-expansion."

### What Outsiders Are Saying

The cement industry is coming in for an increasing amount of interest from Wall Street. Investors who a decade ago wouldn't have given cement the back of their hands now have become acutely aware of the progress and potentialities of the cement industry. Typical is a report by the Stock Exchange firm of Henry Montor Associates, which devoted a great deal of space recently to an analysis of the cement industry. Mr. Montor feels that cement provides a desirable combination of "a growth situation" and "a defensive situation"—which is probably another way of saying that the cement industry at the moment is having its cake and eating it, too.

"Today," writes Mr. Montor, "cement is scarce—even with capacity and operations at record levels. Sales, income, and earnings are sharply up throughout the industry. Cement shares are regaining their appeal of a generation ago . . . Despite sharp price increases, they are still attractive buys."

The brokerage firm of Merrill Lynch, Pierce, Fenner, and Beane also has cast some moon eyes toward cement in a rather detailed treatment of the cement "boom" in a recent issue of their Investor's Reader. This discussion concludes by saying: "But while scattered indications of doubt have attracted wide publicity, the main cement highway continues to be paved with solid plans for future expansion."

### Summing Up

The executive branch of the cement industry today is a curious combination of conservatism and exuberance. Most companies are still headed by the men who grew with them in the early twenties, experienced the lush years of the late twenties, and suffered through the devastating thirties. They are still somewhat prone to look on the boom days of the fifties with an understandable caution, tempered by the recollection of idle capacity not too many years ago. On the other hand, a new and vigorous group of young postwar executives have now moved into responsible positions in many cement manufacturing companies. Some of these young executives have come up through cement company ranks since the war; others have been imported from outside industries.

(Continued on page 218)



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**this BAY CITY  $\frac{3}{4}$  YARD**

**is the buy . . . for fast work**



Want performance in a shovel? Then get a BAY CITY  $\frac{3}{4}$  YARD. Its snappy swing, quick, responsive controls, fine balance and powerful engine provide a fast digging cycle. That means dollars to you in the field.

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ROCK PRODUCTS, August, 1956

217

# SAFE CROSSING



Lines of Naylor lightweight pipe are your safest bet when it comes to transporting water, tailings, air or what-have-you in mining service.

The basic reason for this extra performance is the extra strength and safety built into this distinctive light-wall pipe. Naylor's exclusive lockseamed spiralweld creates a pipe structure that takes punishment both inside and out. Shock loads, stresses and strains don't phase it.

Speed and ease of installation are other advantages made possible by Naylor's one-piece Wedge-Lock couplings that can be assembled or disassembled faster than by any other method—and with just a hammer.

To get the entire story, write for Bulletins No. 507 and No. 513.



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Although this group could hardly be considered wild-eyed reactionaries, they are questioning some of the age-old practices of the cement industry and are prone to look on continued expansion as almost necessary in the face of a burgeoning market and a healthy economy. Like all generalizations this one doesn't hold right down the line. A few of the old-timers have been among the most progressive of the industry leaders, while some of the younger men are advising caution. But this balance between young and old, conservative and liberal, probably is a healthy thing for the industry insuring a sound and studied growth of the cement industry in the years to come.

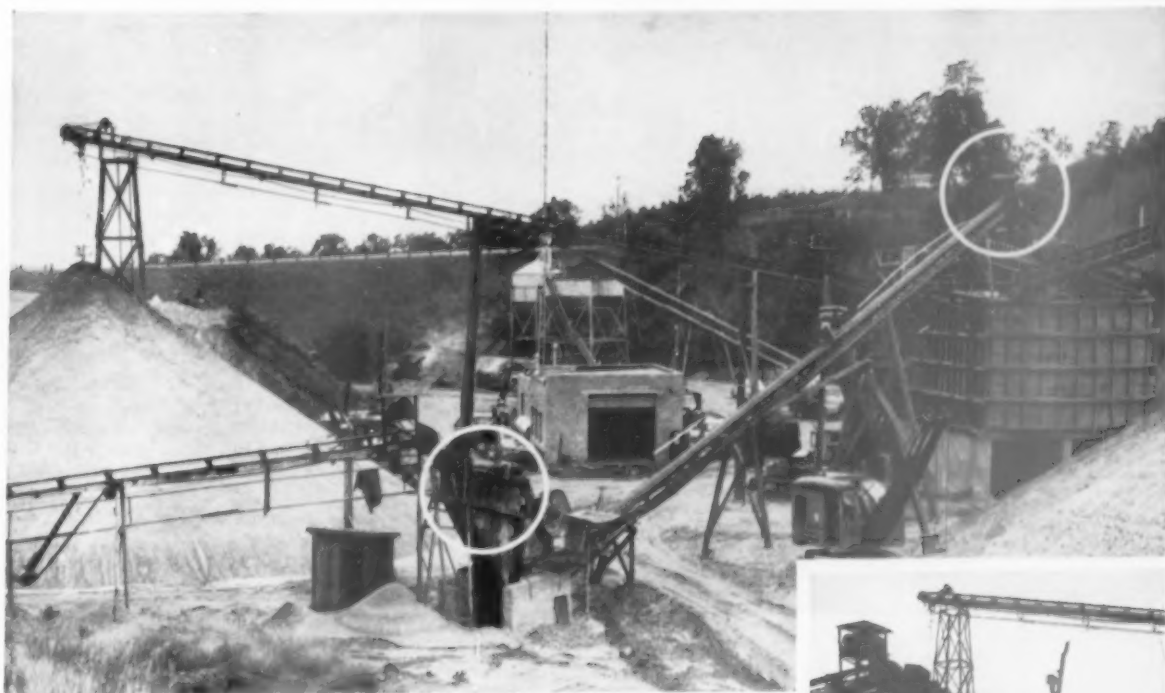
One element in the cement picture is conspicuous by its absence in the comments of most industry leaders. This is the continued development of new uses for cement and concrete and improvement of the product. These two factors probably have been responsible more than anything else for the tremendous growth in the use of cement in the last decade. Prestressed concrete, soil-cement paving, thin-shell roofs and multitudes of precast concrete products have captured the imagination and the pocketbooks of America's builders. Now, there seems to be some danger that thinking in the direction of similar new developments is becoming clouded in the mist of cement shortages.

To summarize, there are a number of overwhelming factors that weigh in favor of further expansion of the cement industry. Most industry leaders favor more expansion, although a strong minority right now are opposed to it. There probably will be a lull in expansion after the presently-building new capacity comes into use in 1957. Then, the industry will begin to grow again. No amount of expanding will completely eliminate spasmodic cement shortages, but they will become fewer and less acute within a year.

Looking ahead, the steady population growth accompanied by an even greater rise in total U. S. production, plus the dire necessity for more and better highways which is leading to stepped-up federal aid—all these should help keep the construction boom going and cement kilns burning close to capacity for some years to come.

## Gypsum Ship Added

GYP SUM TRANSPORTATION CO., New York, N.Y., has placed in service the 10,600-ton bulk carrier, Gypsum Empress. The 440-ft. 13-knot German-built vessel will ply between Staten Island and the mine at Hantsport, N.S.



## "We added the second Deister because the first solved our maintenance problems"



... says T. W. Becken, President of Cemstone Products Company, St. Paul and Lakeland, Minnesota. That first screen, installed in July 1952, is a Deister UHS double-deck 4' x 12'. Previous to its installation, Cemstone had excessive maintenance from transmitted vibration ... and bearing troubles on a competitive screen.

The floating action and over-size springs of that first Deister UHS cushioned vibrations to the supporting structure, the hopper no longer shook, bearing troubles were absent, and production went up.

That's why the second screen is also a Deister! It's a 3' x 8' single-deck scalping screen ... a model UHS in-

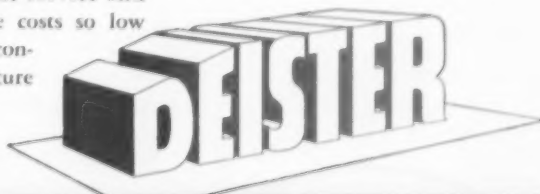
talled at one of the Lakeland plants. BOTH screens have been in use approximately 5 years AND THE TOTAL MAINTENANCE COST HAS AVERAGED OUT AT ONLY \$10 A YEAR! And this ... on a plant production schedule of 800 yards a day, 5 days a week from April through October, often with 2 shift periods totaling 16 hours a day.

Says Art Bodsberg, Foreman of Cemstone's Lakeland Plant No. 1: "Both our first and second Deister screens give excellent service and have cut maintenance costs so low that the screens we continue to add in the future will be Deisters."

- **Unitized life-time vibrating mechanism**—a precision-built, jig-assembled unit. Two bearing construction. Runs in bath of oil. Renewable sleeves prevent wear on bearing housings and shafts.

- **Opposed elliptical throw**—Deister's exclusive powerful throw action controls the movement of material on the screen for greatest speed and efficiency in sizing.

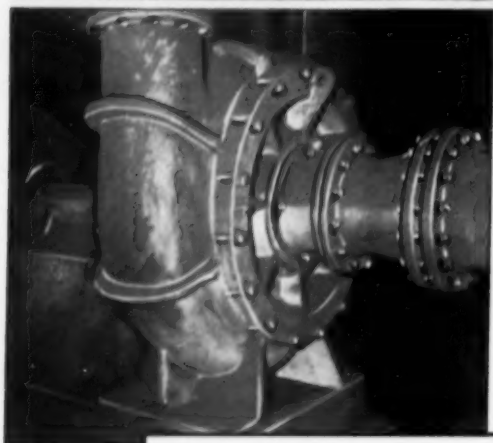
- **Deister's exclusive adjustable slope panels**—independently adjustable at both feed and discharge ends to increase or decrease screening angle.



# DEISTER MACHINE COMPANY

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## Continuous Low-Wear Non-Clog Solids Pumping... At Lower Cost



### **Morris** low-speed wide-clearance **SOLIDS PUMP**

Actual working installation of a low-speed, wide-clearance Morris Solids Pump which handles fine solids at a rate of 6,000 gpm at 52' total head. Pump speed only 370 rpm, 14" suction opening, 12" discharge.

Where total heads do not exceed about 120 feet, low-speed, wide-clearance Morris Type-M Solids Pumps will handle solids ranging from fine abrasives up to pieces 11" in diameter. The low-speed reduces the abrasive action of the smaller particles, the large clearance allows larger solids and "tramp" pieces to pass without trouble.

#### **Longer Wear, Easier Maintenance**

Designed so that the most important wearing parts receive the least wear, initial high mechanical and hydraulic efficiencies are maintained throughout the longer service period of the pump. Double-thick wearing parts are sub-divided and protected so that the greatest erosion is taken by easily replaced segments. That means speedy, easy renewal, less down-time and lower maintenance cost.

#### **Free Consultation**

Morris engineers are always available to discuss and study your pumping problems with you. Describe your needs in a letter—or call your nearest Morris office. Our recommendations are free—entail no obligation. Write for Bulletin 175 which describes the Type M Solids Pump in detail.

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# MORRIS

## Centrifugal Pumps

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## **PACIFIC COAST BOOM**

(Continued from page 152)

1500-hp. motor. The F. L. Smith & Co. grinding units will have slide shoe bearings and Symetro drives.

The Riverside Cement Co. has two plants; one at Crestmore in Riverside County and the second at Oro Grande in the outer group. The Crestmore mine is described in this issue. The company is opening a new limestone deposit at Oro Grande. The new quarry, the Sparkuhle, supplements the older Shay-Klondyke quarry. The Sparkuhle deposit is said to be one of the largest high-calcium limestone deposits in California. The deposit is 3.7 miles from the plant and studies are being made as to type of rock transportation to the kiln area, and this may include a new crushing plant. In the new pit a 40-ton struck load Tournarocker is used on an experimental basis.

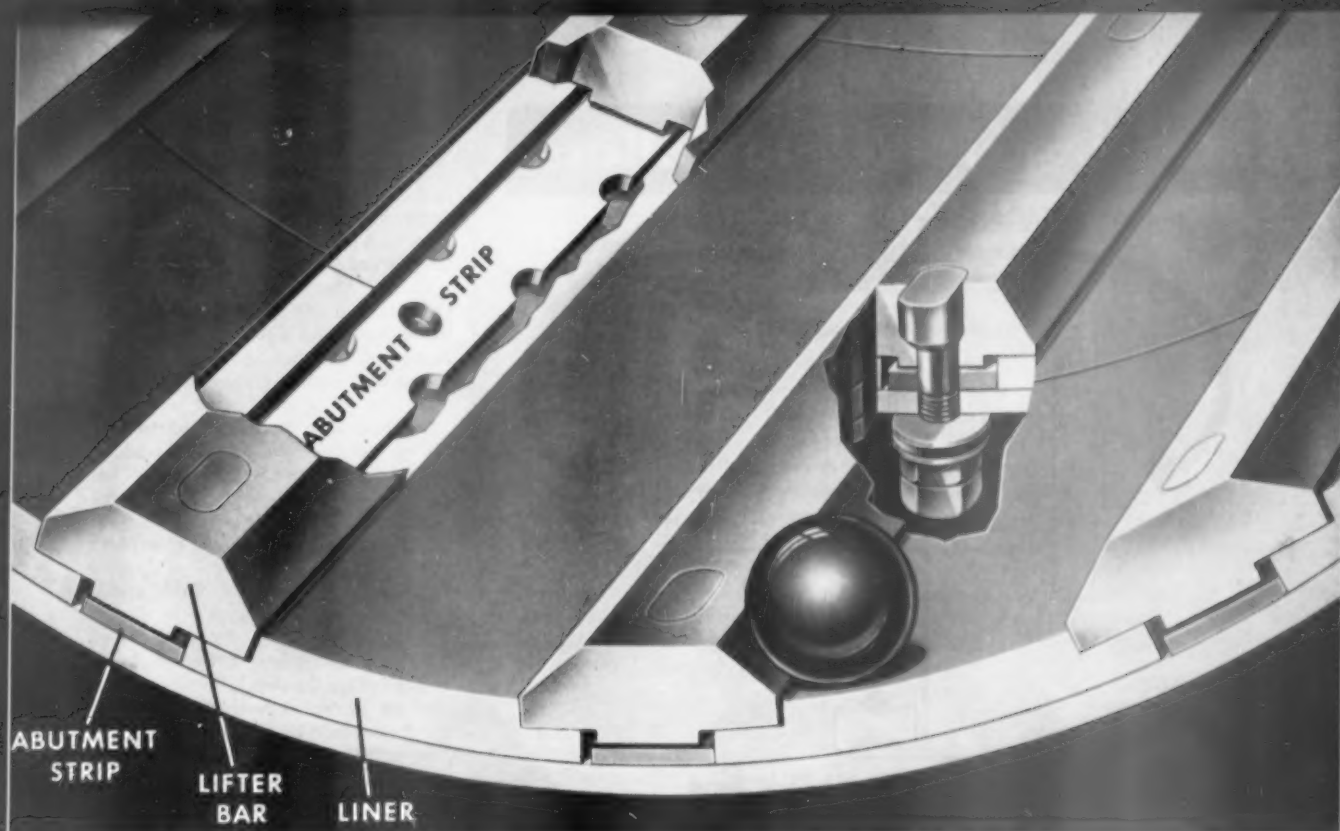
It uses a General Motors diesel engine embodying some new departures. The unit turns easily, has only about ten places to lubricate. Road speeds reach 32 m.p.h. Low maintenance costs are expected from the unit.

In the mill, two new 12- x 17-ft. grinding mills are being installed on the finish side, and each mill will be driven by a 1250-hp. motor. The mills use F. L. Smidth & Co. Symetro gears, and the grinding units are supported on a single tire located near the center line of the mill. A balancing, anti-friction bearing on the drive shaft is located at the discharge end of the mill. In addition, one of the raw mills is being equipped with auxiliary items so it can be used as either a raw or finish mill. These changes will bring the Oro Grande plant's finish grinding more in balance with the raw.

Additional cooling capacity for clinker is another recent addition to some of the older and smaller kilns. The new waste heat plant at Oro Grande was described in detail in *ROCK PRODUCTS*, August, 1955, p. 76.

Important changes in the power plant are underway at Crestmore. These changes are designed to more adequately increase the dust collecting efficiencies of the electrical precipitator. This work includes replacement of some of the waste heat equipment and generators. With the addition of a new Westinghouse 5000 kw. turbine generator, the total power output will be about 12,000 kw. The Crestmore operation is of considerable historical significance, for the first Cottrell electrical precipitators to go into any portland cement plant were installed there about 40 yrs. ago by Western Precipitation Co. The units still are giving ex-





## New liner saves cement mill wear

Here's KENSINGTON's latest triumph in its *War Against Wear*... the new Oro-Lok Lining for cement grinding mills.

By combining superior, wear-resisting materials and improved design, this revolutionary new lining successfully overcomes the most common causes of wear, breakage, and excessive maintenance.

Briefly, here are just a few of the important improvements:

**Patented, welded-on abutment strip** reinforces shell at location of bolt holes.

**Bolts seldom loosen.** In conventional

linings, shocks and blows set up a shearing stress which causes bolts to loosen and break, thus requiring frequent, regular, and costly servicing. As seen above, Oro-Lok design *completely eliminates* this common cause of trouble because liner plates butt against abutment strips which absorb all lateral stress. Bolts are subject to tension only.

**OROLOY lifter bars outlast others.**

OroLOY is a special super-hard, super-tough alloyed high-manganese steel. Not only is it hard to begin with, but it *actually fights back against wear* by developing

even greater surface hardness when subjected to impact of balls. You can expect OroLOY Lifter Bars to last as long as the liner itself... and when necessary, they can be easily renewed or reversed without disturbing rest of the lining.

**Needs no grouting-in.** Since not enough abrasive material can enter behind plates to cause serious scouring, there's no need for zincing or grouting-in.

For more information on the new Oro-Lok Lining and how much it can save you, phone or mail coupon today. You'll be under no obligation.

Other wear-resisting KENSINGTON replacement parts:



**DIVISION HEAD SECTION**  
for grinding mill has exclusive design features which greatly prolong service life.

### SCREENS, GRATES, LINERS

and other alloyed manganese steel replacement parts fit all standard cement mills.



### CHAINS, SPROCKETS

150 different standard chains and sprockets plus many special models... all of wear-defying KENKROME.

### KENKROME ELEVATOR BUCKETS

far outlast ordinary fabricated buckets wherever abrasion and impact are important factors.



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STEEL COMPANY

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☐ Please send more information on ORO LOK Lining.

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Description of mill: Make \_\_\_\_\_

Model \_\_\_\_\_ Present Liner Thickness \_\_\_\_\_

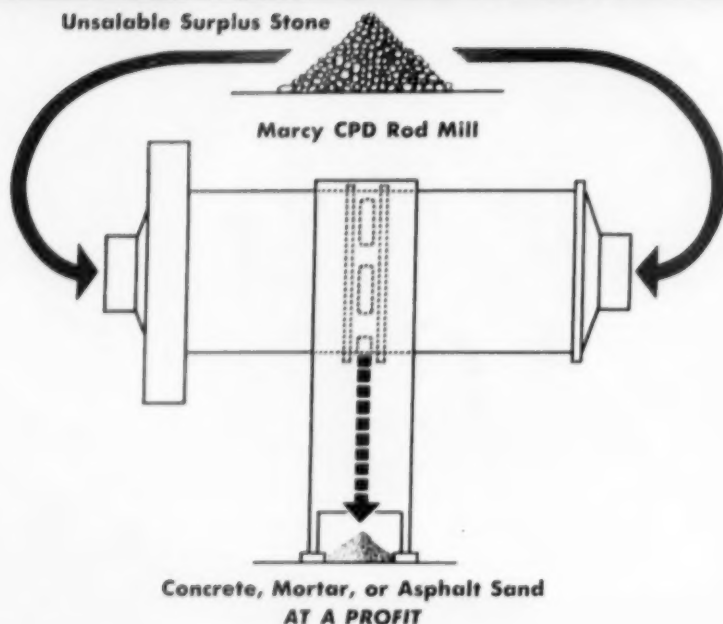
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COMPANY \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ ZONE \_\_\_\_\_ STATE \_\_\_\_\_

# Turning stone into dollars



## Flexibility of Marcy CPD Mills Permits Production of Concrete, Mortar, or Asphalt Sand

**Operating Advantages**—Compared with crushing, experience has proved these additional advantages of grinding by Marcy CPD Mills:

**Low Cost**—low maintenance, less steel consumption and less power per ton result in an overall cost generally less than 25c per ton, exclusive of amortization.

**Flexibility**—by varying rate of feed, pulp dilution, and discharge port area it is possible to change gradation of finished product to meet different specifications.

**Wet or Dry Grinding**—on dry grinding moisture content is not as critical as with other type crushers.

**Cleaner Operation**

**Capacities**—from 2 to 200 dry tons per hour

*Marcy Center Peripheral Discharge Rod Mills have been earning profits for sand and gravel operators since 1925. Let our engineers, experienced in manufacture of sand, assist you on your problems.*

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**The  
Mine & Smelter  
Supply Co.**

DENVER 17, COLORADO

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cellent service after processing of millions of tons of clinker.

Riverside Cement is building bulk facilities that are designed to triple the company's existing cement shipping ability. A new cement stock house at Oro Grande will soon double storage capacity. Also under construction at Oro Grande are packing and loading installations and a new office and laboratory. Crestmore and San Diego are to get new bulk handling facilities.

**Southwestern Portland Cement Co.**, during the past few years, has added production facilities in various degrees at the three plants. The Victorville plant now has four 10½- x 330-ft. kilns in addition to the five older 10- x 200-ft. kilns. New ball mills have been added to the finish grinding department to take care of the increased capacity of the new kilns. The raw department is essentially as it was before the new kilns were added and the increased production required has been made by closed circuiting the raw mills with screens and liquid cyclones. The Black Mountain quarry and crushing plant was described in **ROCK PRODUCTS** in August, 1955. New cement storage silos using Airslide conveyors throughout have been erected.

The El Paso plant has added clinker producing facilities. A new ball mill has been added to the finish grinding department. The electrical distribution system of the plant has been modernized. An aeration blending tank for kiln feed has been installed and bulk loading facilities have been augmented.

The Fairborn plant has added one 10½- x 330-ft. wet kiln to the existing four 10½- x 175-ft. kilns. The raw and finish grinding departments have had new mills installed.

**Superior Portland Cement, Inc.**, has two plants, one at Concrete, Wash., and one in Seattle. They have a capacity of 1,700,000 and 1,000,000 bbl., respectively. From the Concrete operation, trucks handle about 20 percent of the total. From Seattle, trucks and water shipments handle 100 percent. All truck shipments are by contract haulers.

**British Columbia Cement Co., Ltd.**, at its Bamberton plant on Victoria Island, is installing an additional kiln and a Traylor grinding unit powered by a 1500-hp. motor along with auxiliary items. This is expected to up the annual capacity by 20 percent. Also on the Vancouver water-front the company is building a bank of four silos that have a capacity of 50,000 bbl. Bulk cement is towed in covered barges to distributors and ready-mixed

(Continued on page 224)

# CONTACT

## SPRAGUE & HENWOOD, Inc. FOR ALL OF YOUR DIAMOND DRILLING NEEDS



### CONTRACT DIAMOND DRILLING ANYWHERE

Many, many firms throughout the United States and the world know the advantages of core drilling; and Sprague & Henwood, with more than 70 years of experience, is the leader in this field. Sprague & Henwood crews have completed thousands of contracts successfully in every conceivable condition. For the best in exploratory core drilling (surface or underground), blast hole drilling, directional drilling, foundation test drilling, grout hole drilling, and pressure grouting—be sure to call Sprague & Henwood. Estimates and suggestions given without charge.



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CORING BIT



IMPREGNATED CORING  
BIT



"ORIENTED" DIAMOND  
"TAPER" TYPE NON-CORING BIT



DOUBLE TUBE REAMING  
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### "ORIENTED" DIAMOND BITS

Any bit you buy will work for a while. But if you specify or order Sprague & Henwood "Oriented" Diamond Bits, giving all information on your drilling conditions, you will receive the bit or bits that will do the best job for you. Lower your cost per foot, with a minimum of diamond loss. Write today for

complete "Oriented" Diamond Bit Bulletin #320-1.

#### RESETTING SERVICE

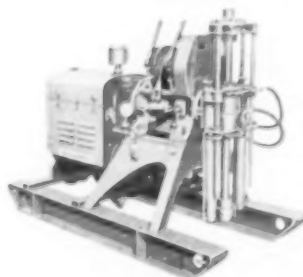
Send in your bits that need resetting, giving full details of results obtained and conditions under which bits were used. They will be returned new—and "Oriented" to give you less diamond loss and lower your cost per foot.

### FIELD TESTED DRILLING MACHINES

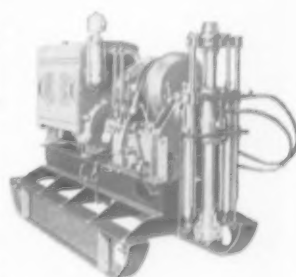
Field Tested means just that... with contract work being done under every conceivable condition, Sprague & Henwood drilling machines have to perform right. Different sizes and types to meet various conditions are available. Your conditions should be given in detail, and recommendations will be forwarded to you immediately, without cost.

#### ACCESSORY EQUIPMENT

In addition to drilling machines, and diamond bits, Sprague & Henwood manufactures and can supply you with a complete line of accessory equipment necessary to make up a drilling outfit, such as drill rods, core barrels, casings, fishing tools, etc. A new and most complete Catalog, No. 400, listing all accessory equipment is available to you. Write today for your free copy. It will be mailed promptly.



MODEL 40-C  
CORE DRILL MACHINE



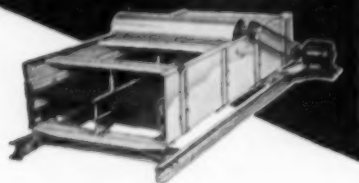
MODEL 142  
CORE DRILL MACHINE

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**UNIVERSAL  
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SCREEN CO.**  
Racine, Wisconsin  
Quality Screens Since 1919

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(Continued from page 222)

concrete plants, which are so located that they can be reached by water transportation. Fuller-Kinyon pumps unload the barges. At the new distribution plant of the company, the haulage practice will parallel that formerly used.

The added storage capacity also will help production by allowing the plant to operate at greater capacity during the slack periods. Sacking facilities will be provided at the new distribution plant. The new additions will bring the Bamberton plant up to 2,400,000 bbl. per year. The plant operates wet.

In the British Columbia and in the Vancouver area there has been during the past two years considerable talk of a cement plant to be built by German interests, but so far this project has not taken hold and appears to be dead. However, a second plant, this one by the LaFarge interests of France, has broken ground for a plant to be built on Lulu Island adjacent to Vancouver. Work so far consists of bulkheading the water-front and back-filling behind the bulkhead as the general area is low ground. It is expected that the plant will be in operation in the late summer of next year. Rock will be water-hauled from Texada Island.

## Holmes Safety Association Recognizes 27 Companies

TWENTY-SEVEN COMPANIES in the mineral industry walked off with safety awards at the 1956 annual meeting of the Joseph A. Holmes Safety Association. The 40-year-old Holmes Association presented awards to companies operating either without lost-time accidents or without fatalities. Recognition also was given to individuals who have worked 40 years or more without a lost-time accident and to supervisors whose men have 250,000 hours underground or 350,000 hours above ground without a lost-time accident.

Founded in 1916, the safety association was set up to continue the efforts of Dr. Joseph A. Holmes, first director of the Bureau of Mines, to reduce accidents and ill health in the mining, metallurgical, and allied industries. The Bureau of Mines still works closely with the association.

This year 548 awards were made giving recognition to companies and individuals in all phases of the mining industry. The following quarries, non-metallic mines, and companies were honored for operating without a fatality:

Bessemer Limestone Quarry, Bessemer, Penn.—28 years  
Florida Phosphate Division, Davison Chemical Co., Bartow, Fla.—4 years  
Pauway No. 4 Mine, Florida Phosphate Division, Davison Chemical Co., Bartow, Fla.—9 years  
Birmingham Rock Quarry, Lone Star Cement Corp., Birmingham, Ala. 31 years  
No. 5 Limestone Mine, Tennessee Coal and Iron Division, U. S. Steel Corp., Bessemer, Ala.—24 years

Awards for years of operation without lost-time accident:

Alpha Portland Cement Co., Birmingham, Ala., plant and quarry—3 years  
LaSalle, Ill., plant and quarry—3 years  
St. Louis, Mo., plant and quarry—5 years  
Sydney Mine, American Cyanamid Co., Brewster, Fla.—2 years  
Bessemer, Penn., plant, The Bessemer Limestone and Cement Co.—2 years  
Colton plant, California Portland Cement Co., Colton, Calif.—14 months  
Ridgewood mine, Florida Phosphate Division, Davison Chemical Co., Bartow, Fla.—4 years  
Natividad quarry, Kaiser Aluminum and Chemical Corp., Permanente, Calif.—6 years  
Rockmart, Ga., plant and quarry, Marquette Cement Manufacturing Co.—15 months  
Thornton, Ill., quarry, Material Service Corp.—2 years  
Clinchfield, Ga., No. 2 quarry, Penn-Dixie Cement Corp.—24 years  
The Standard Lime and Cement Co., Kimballton, Va., plant—3 years  
Knoxville, Tenn., plant—6 years  
McCook plant, LaGrange, Ill.—3 years  
Woodville, Ohio, plant—3 years  
Texas Gulf Sulphur Co., Newgulf, Tex.  
Dolanah, Ala., quarry, Tennessee Coal and Iron Division, U. S. Steel Corp.—2 years  
Calcite Limestone quarry, Michigan Limestone Division, U. S. Steel Corp., Rogers City, Mich.—22 months  
Leeds, Ala., plant, Universal Atlas Cement Co.—3 years  
Bell Mine, Warner Co., Bellefonte, Penn.—3 years  
Lone Star Cement Corp., Dallas, Tex., quarry—5 years  
Birmingham, Ala., Rock quarry—13 years  
Western Gypsum Co., Sigurd, Utah—6 years

(Continued on page 226)

## MORE ECONOMICAL BREAKAGE



WITH "CAPE ANN"  
THE **FORGED** STEEL  
DROP BALL

HIGHLY EFFICIENT SECONDARY BREAKAGE  
MEANS—MORE TONNAGE—MORE PROFITS

The "Cape Ann" Forged Steel Drop Ball is noted for its long life and better wearing qualities for use in secondary breakage. It is "TOPS" in the drop ball field where constant pounding day in and day out make it absolutely necessary that ruggedness and dependability be the key factor to insure maximum production.

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IMMEDIATELY

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**CAPE ANN ANCHOR & FORGE CO.**

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*at Pacific Building  
Materials, Portland  
Oregon . . .*

# UP GOES ANOTHER SAND PREP

## *No. 8 in a series of steady WEMCO producers*

1956 addition to this Portland company's sand recovery operation is the 36-inch Wemco Sand Preparation Machine being installed above. It has an outstanding performance record to live up to! For instance, since the first of 7 similar Wemco units went into operation in 1948, plant manager Howard Hamlin reports that to date "Only \$33 worth of spare parts have been ordered." But the real story of Pacific's continued use of Wemco Sand Prepara-

tion Machines lies in their ability to invariably produce specification materials under all feed conditions. Wemco's slow-speed, multiple-pitch spirals, operating in a large, quiet pool, insure the recovery of the desired fine (150 mesh) sand without a sacrifice in raking capacity. This unbeatable combination of low-operating costs and specification sand spell profits for Pacific on every one of their 8 Wemco units. They can do the same for you.

Send Wemco your sand problems for profitable solutions.



760 J FOLSOM STREET • SAN FRANCISCO 7, CALIF.

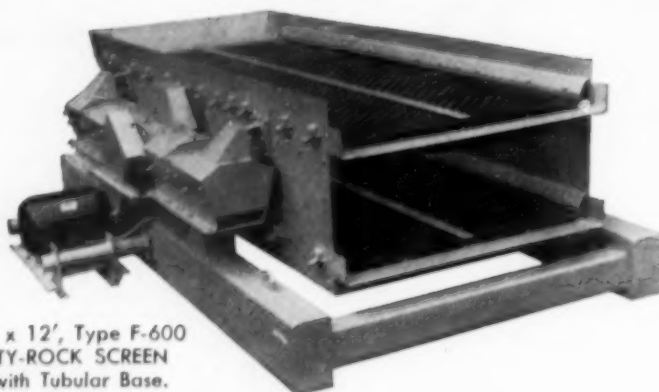
*Representatives in principal cities of the United States and Canada and in major countries throughout the world.*

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ROCK PRODUCTS, August, 1956

225

## FOR PROFITABLE SCREENING USE



5' x 12', Type F-600  
TY-ROCK SCREEN  
with Tubular Base.

### TYLER VIBRATING SCREENS AND TYLER WOVEN WIRE SCREENS

There is a Tyler Vibrating Screen for every sizing and dewatering job. Tyler Screens are noted for the huge tonnages handled with top efficiency and low cost per ton.

Tyler Woven Wire Screens are made in all meshes and metals in over 10,000 different specifications. Ton-Cap and Ty-Rod Screens with the long-slot openings provide the greatest capacity for a given discharge area.

## THE W. S. TYLER COMPANY

CLEVELAND 14, OHIO

Manufacturers of Woven Wire Screens and Screening Machinery

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## WHAT ARE YOU PAYING FOR REPAIRS?

The money you are paying to keep worn-out equipment working may be just enough for you to own better equipment.

See the "WHERE TO BUY" Section

## HOLMES SAFETY AWARDS

(Continued from page 224)

### Awards to supervisors:

Hubert H. Bohrer, The Standard Lime and Cement Co., Martinsburg, W. Va.  
Edward S. Rabenstein, Bethlehem Limestone Quarry, Hanover, Penn.

### Awards to individuals with 40 years or more without lost-time accident:

J. Walter Baird, Michigan Limestone Division, United States Steel Corp., Grove City, Penn.  
Wilbur J. Baughman, Warner Co., Bellefonte, Penn.  
A. D. Blair, Universal Atlas Cement Co., Leeds, Ala.  
Amazon Brown, Universal Atlas Cement Co., Leeds, Ala.  
A. W. Byers, Universal Atlas Cement Co., Leeds, Ala.  
Albert W. Cox, North American Cement Corp., Hagerstown, Md.  
Nicola Dattilo, North American Cement Corp., Hagerstown, Md.  
Michael Edward DeCorte, Michigan Limestone Division, United States Steel Corp., East Brady, Penn.  
Egiato Fontanini, Michigan Limestone Division, United States Steel Corp., East Brady, Penn.  
E. L. Godwin, Universal Atlas Cement Co., Leeds, Ala.  
J. A. Grimes, Universal Atlas Cement Co., Leeds, Ala.  
Charles H. Hiles, Michigan Limestone Division, U. S. Steel Corp., East Brady, Penn.  
J. D. Lawrence, Universal Atlas Cement Co., Leeds, Ala.  
Aldrich Lee, Universal Atlas Cement Co., Leeds, Ala.  
Salvado Macaluson, The Bessemer Limestone and Cement Co., Bessemer, Penn.  
E. E. Minor, Universal Atlas Cement Co., Leeds, Ala.  
H. G. Muir, Universal Atlas Cement Co., Leeds, Ala.  
C. L. Owen, Universal Atlas Cement Co., Leeds, Ala.  
Walter Rowan, Universal Atlas Cement Co., Leeds, Ala.  
Antonio Surrano, North American Cement Corp., Hagerstown, Md.  
Russell C. Zeigler, North American Cement Corp., Hagerstown, Md.

## Open Rare Earths Plant

DAVISON CHEMICAL Co., Division of W. R. Grace & Co., and its affiliate, Rare Earths, Inc., have opened a plant devoted to processing monazite sand into rare earths and thorium at Curtis Bay, Baltimore, Md.

The new plant has been designed to produce in tonnage quantities the rare earths as salts including oxides, fluorides, and sulphates, as well as cerium and thorium compounds. Processing capacity is from 15 to 25 tons per day of monazite sand, a phosphate rock.

Received in bulk or bag shipments, the monazite sand is unloaded into special hopper bins. It is weighed and conveyed through an extremely accurate sampling system, necessitated by its cost, which is sometimes as high as \$400 per ton.

The monazite is ground in a ball mill and automatically batch-weighed, then conveyed to special reactors where it is heated with sulphuric acid. The rare earth metals remain insoluble in this sulphuric-phosphoric acid, but after removal from the concentrated acids are dissolved in cold water and freed from other metallic salts by sedimentation, filtration and precipitation, then converted to the appropriate finished product.

# Breaker Parts by AMSCO®

## Cut Costs Where It Counts



**Impeller Bars, Breaker Bars and Liner Plates of extra tough Amsco Manganese Steel reduce wearing action.**

The violent breaking action of primary rock, the high-speed impact of stone thrown by impeller bars against breaker bars and liner plates, give this breaker a terrific pounding. These parts are designed for minimum wear with Amsco Manganese Steel . . . in this heavy-duty "Cedarapids" Model 5360H Impact Breaker, produced by Iowa Manufacturing Company.

Amsco Manganese Steel crusher parts, made of "the toughest steel known", give a much

longer life span to these main wear points. This extra-tough steel work-hardens under impact. Abrasion polishes manganese steel, and yet it retains high-ductility qualities.

Breaker parts by Amsco *cut costs where it counts* . . . by reducing parts-replacement time to a minimum, and by giving much longer service life between repair periods.

Amsco makes manganese steel breaker parts for most major manufacturers of crushing, grinding and pulverizing equipment. Call your manufacturer's representative for further information on Amsco breaker parts.



# AMSCO

American Manganese Steel Division • Chicago Heights, Ill.

OTHER PLANTS IN: DENVER, LOS ANGELES, NEW CASTLE, DEL., OAKLAND, CAL., ST. LOUIS, JOLIETTE, QUEBEC

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ROCK PRODUCTS, August, 1956

227

# STEEL

**Every Kind  
Quick Delivery  
Plates, Structural,  
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Carbon, Alloy, Stainless  
Steels, Babbitt Metal.**

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Joseph T. Ryerson & Son, Inc. Plants at  
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### MANUFACTURERS NEWS

**Fulton Bag & Cotton Mills**, Atlanta, Ga., has been purchased by a group of industrialists for approximately ten million dollars. A new board of directors was elected including Julius W. Abernethy, Newton, N.C.; David Berdon, New York City; I. T. Cohen, Atlanta; Thomas L. Kaplan, Toledo, Ohio; Joseph Karp, Cincinnati, Ohio; Jay Levine, New York City; Bernard A. Mitchell, Chicago; Moses Richter, Mt. Gilead, N.C.; A. A. Shuford, Jr., Hickory, N.C., and Herbert L. Werner, New York City. Officers elected are Robert O. Arnold, president; Jason M. Elsas, vice-president and general manager, bag division; Norman E. Elsas, vice-president and general manager, mill division; and Clarence E. Elsas, vice-president and general manager, fabrics division.

**Euclid Division**, General Motors Corp., Cleveland, Ohio, announces that W. B. Dickerson has been appointed district sales representative for California and Nevada (except Elko and White Pine counties), with headquarters in Oakland, Calif., which have been moved to the Latham Square Building. He was formerly district sales representative in the Seattle, Wash., area. Announcement has also been made of the opening of a new sales and service branch in Minneapolis, Minn., with Walter Vranesh as office manager and W. R. Brown, T. J. Mickelson and R. J. Schroeder as district representatives.

**The Prescon Corp.**, Corpus Christi, Texas, has been formed through the merger of Prescon, Inc., Paramount, Calif., and Prescon of Texas, Corpus Christi, to manufacture headed, cold-formed steel-wire units for stressing concrete. Officers of the new firm are Guy Braselton, president; Lorla L. Gerber, vice-presi-

dent; Mrs. Clevia Braselton, secretary; Billy Braselton, treasurer; and Bobby Braselton, assistant secretary. Karl H. Middendorf, who developed the system for producing units for stressing concrete, is chairman of the board.

**Cummins Engine Co., Inc.**, Columbus, Ind., has elected the following directors: H. E. Bollwinkel, who was also promoted to vice-president-service; C. R. Boll, vice-president-sales; and R. B. Stoner, vice-president-personnel. R. E. Huthstainer is president of the company; J. I. Miller, chairman of the board; and C. L. Cummins, honorary chairman of the board.

**American Hoist & Derrick Co.**, St. Paul, Minn., has announced establishment of a new sales development department designed to give equipment distributors more assistance in sales promotion and market coverage. Don W. Martin, formerly assistant advertising and sales development manager of Schield Bantam Co., has been placed in charge of the program.

**Poor & Co.**, Chicago, Ill., announces the following elections: Eugene C. Bauer, chairman and chief executive officer; Max K. Rupert, president; and Eugene C. Bauer, Jr., executive vice-president. Re-elected were A. J. Frystak, secretary; R. W. Sergeant, treasurer, assistant secretary and comptroller; and R. E. Mitchell, assistant secretary and assistant treasurer.

**International Harvester Co.**, Chicago, Ill., announces the election of John L. McCaffrey as chairman of the board and chief executive officer. Peter V. Moulder, formerly executive vice-president, has been named president of the company to succeed Mr. McCaffrey.

**Western Precipitation Corp.**, Los Angeles, Calif., announces that Norman M. McGrane, chief technical engineer, has been made a director, replacing W. Malcolm Schmidt, who has

(Continued on page 230)

## LINK-BELT Cast Elevator Buckets--

# FILL FAST, LAST LONGER

TAKE a look at this construction. No weak spots anywhere in Link-Belt Cast Buckets.

**REINFORCED CORNERS and DOUBLE-THICK backs** add strength at points of greatest stress.

**MALLEABLE IRON OR PROMAL** with its ductility, high strength and uniformity helps these buckets stand up under severe service . . . resist abrasive wear and corrosion.

**SMOOTH interior** with rounded corners is properly proportioned for fast pickup and clean, quick discharge.

Six styles of Link-Belt cast elevator buckets—as well as a complete line of steel buckets—are available in a full range of sizes for handling a wide variety of materials. The ideal combination for your bucket elevators is Link-Belt chains, wheels and buckets. Ask your Link-Belt sales representative or authorized stock-carrying distributor for complete information and for your copy of Link-Belt Standard Products Catalog 950.

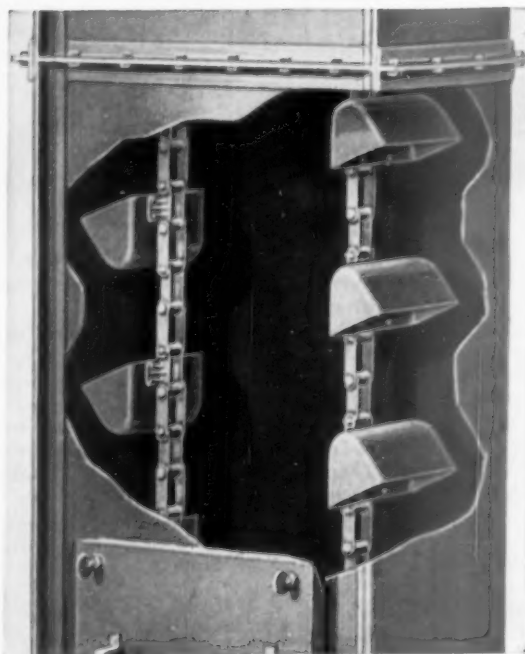
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## LINK-BELT

CAST ELEVATOR BUCKETS

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office: New York 7; Canada, Scarborough (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World.

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# This cab lets you TAKE IT EASY on tough jobs!

Modern features in new Chevrolet truck Flite-Ride cabs make your work easier and safer than ever before . . . give you the pleasure and prestige of style that equals many passenger cars!

Those numbers in the picture (right) point out features that make business almost a *pleasure* when you work behind the wheel of a modern Chevrolet Task-Force truck! Here are some of the reasons why hauling in a Chevy is *easy* on you:

① *Concealed Safety Steps*—located inside the doors—stay clear of snow, mud, and ice, give you firmer, safer footing. ② *Spacious leg room* helps keep you comfortable all day long, brings you home fresher and more relaxed. ③ *Nu-Flex seat* design means *comfortable* hauling! Jack-stringer springs give ideal body support; seat back adjusts easily. ④ *High-Level ventilation system* keeps the cab interior clean, cool, comfortable. Intake is at the bottom of the windshield—away from road heat and dust. ⑤ *No-Glare instrument panel*, with handsome two-tone finish, puts instruments and controls within easy sight and reach. ⑥ *Panoramic windshield* provides a full 1000 square inches of



forward viewing area to make driving safer, easier. ⑦ *Full-View rear window\** adds to safe, convenient viewing as well as truck style.

And you'll find bright, stylish interior appointments that add to your sense of pleasure on the job. If your work calls for long hours on the road, you'll enjoy life more in a Flite-Ride cab! Check one over for yourself at your Chevrolet dealer's. . . Chevrolet Division of General Motors, Detroit 2, Michigan.

\*Optional at extra cost.



**They're the work champs of their class—with new V8's, automatic transmissions for every truck model!**

You get *modern* power-performance in these Chevy medium-duty models! Compact short-stroke V8's do more work yet keep costs down. *Hydra-Matic* transmission† gives you no-shift hauling, reduced maintenance. And there's great *Powermatic*!—the first automatic transmission designed specially for big trucks!

†Optional, extra cost, Series 3000-4000 models. ‡Optional, extra cost, Series 5000 through 10000 truck models.



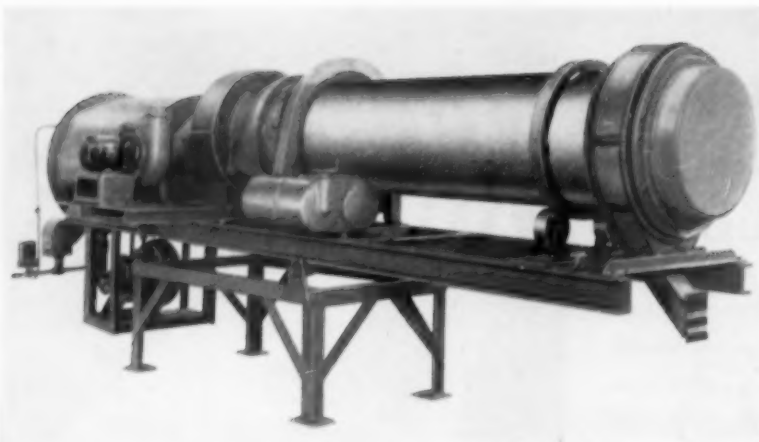
## NEW CHEVROLET TASK-FORCE TRUCKS

Anything less is an old-fashioned truck!

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ROCK PRODUCTS, August, 1956

229



## PILOT PLANT ROTARY DRYER

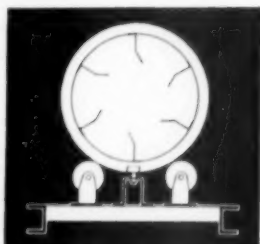
The Ruggles-Coles Pilot Plant Dryer is designed especially for laboratory use or for small capacity unit operations requiring a continuous or intermittent drying step. Each unit:

- Is mounted on a structural steel base.
- Has removable "knockers."
- Provides for easy changing of shell rotation speed or shell slope.
- Is available in stainless steel or other corrosion-resistant materials.
- Requires only fuel supply and power connections to be placed in operation.
- Is easily moved from place to place.

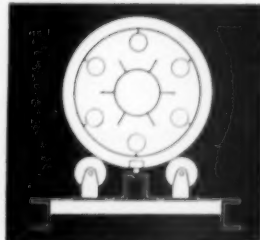
It is available in three models:

- (1) XH-XF single-shell, direct gas fired dryer. Arranged for either parallel or counter-flow operation. Bulletin AH-471.
- (2) XB double-shell, indirect-heat, gas-fired dryer for drying without contamination. Volatiles removed with only limited dilution. Bulletin AH-472.
- (3) XC steam-tube indirect heat dryer. Can be connected to any available steam supply or furnished with a 3-HP steam generator. Bulletin AH-473.

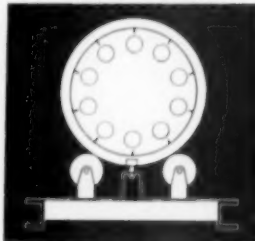
For complete information write Department 7.



XH-XF SINGLE-SHELL



XB DOUBLE-SHELL



XC STEAM TUBE

# HARDINGE

COMPANY, INCORPORATED

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 New York • Toronto • Chicago • Hibbing • Houston • Salt Lake City • San Francisco  
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resigned. Alfred W. Knight has been appointed general manager in addition to his duties as executive vice-president.

**Pioneer Engineering Works, Inc.**, Minneapolis, Minn., announces that Carl R. Rolf has been elected executive vice-president, and Roy L. Slama has been appointed comptroller. Mr. Rolf was formerly first vice-president and has been with the firm more than 25 years, serving as salesman, assistant sales manager, sales manager and vice-president in charge of sales. Mr. Slama has been with the company since 1950.

**Borg-Warner Corp.**, Chicago, Ill., has announced plans to spend approximately \$25,000,000 for expansion of the Marbon chemical division plant in Washington, W. Va., the Byron Jackson division electronics plant and laboratory in Santa Ana, Calif., and the research center being erected in Des Plaines, Ill. In addition, construction of a new \$11,000,000 plant of Borg-Warner Ltd., Letchworth, England, has been announced.

**Bergen Machine & Tool Co., Inc.**, Nutley, N. J., has announced the appointment of Ivan W. Benson, Decatur, Ga., as sales representative in Georgia and Alabama. Don Bush, Miami, Fla., who formerly covered several states in the southeast, will cover only the state of Florida, and Karl Eggert, formerly sales representative on the West Coast, has been assigned to cover North Carolina and South Carolina and a portion of the southwest.

**The Albemarle Paper Mfg. Co.**, Richmond, Va., has announced the appointment of J. R. Clements as vice-president and general sales manager of the Raymond Bag Corp., Middletown, Ohio, which was recently purchased by Albemarle and made a division of the company. Mr. Clements was formerly general sales manager of the multiwall bag division of Ablemarle.

**Richard F. O'Mara** and **Carl R. Flodin**, formerly with Western Precipitation Corp., Los Angeles, Calif., have formed the firm of O'Mara and Flodin, Inc., 1111 Wilshire Blvd., Los Angeles, Calif., dust control equipment application engineers, specializing in engineering services in the dust and fume control and drying air separation fields.

**Gar Wood Industries, Inc.**, Wayne, Mich., has appointed D. E. Ollendorf as eastern district manager of the construction equipment division in Findlay, Ohio. Formerly sales administrator for the division, Mr. Ollendorf's territory covers Virginia, Maryland, West Virginia, Delaware, Pennsylvania, New Jersey, New York, Connecticut, Massachusetts, New Hampshire, Vermont, Rhode Island and Maine, also Quebec, New Brunswick and Nova Scotia.

**Greer Hydraulics, Inc.**, Jamaica, N. Y., has announced the election of Fred M. Glass as a director of the company. He is senior vice-president and chief executive officer of the Empire State Building Corp. F. Parker Westenberg has been appointed sales engineer for the products division in the New England territory including Connecticut.

**Marion Power Shovel Co.**, Marion, Ohio, and its subsidiary, The Osgood Co., have announced the election of Milton T. Smith as president and general manager. He has been serving as vice-president and general manager of both companies, which operate as part of the equipment department of Merritt-Chapman & Scott Corp., of which Mr. Smith is an executive vice-president.

**Worthington Corp.**, Harrison, N. J., has appointed A. William Fraser and Clarence S. Wentworth as commercial vice-presidents. Mr. Fraser, who has been midwest regional sales manager since 1951, is in charge of the district

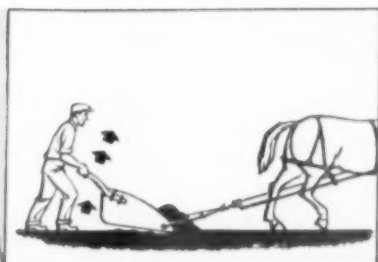
(Continued on page 232)

# REMEMBER The Old Slip Scraper

## "digging action"?



Operator controlled scraper with his hands—kept it flat until scraper reached digging point.

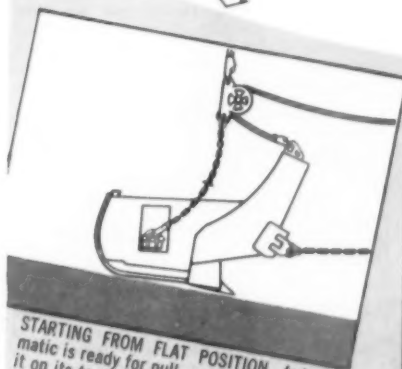


When digging point is reached, operator raised handles, causing lip of scraper to dig into the ground.

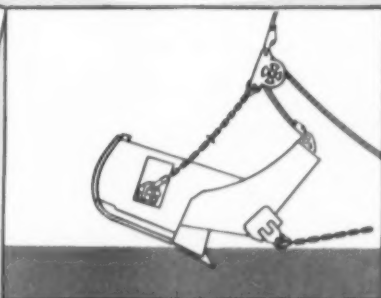


Weight of material moving into bowl levels scraper off. Continued filling drops rear out of the ground, which raises front lip and scraper comes up.

in Page **AUTOMATICS**  
the same action is  
**BUILT-IN!**



STARTING FROM FLAT POSITION, Automatic is ready for pull — no need to drop it on its teeth to start digging.



With slack hoist, first tension on load line automatically shifts a Page Bucket's weight to the teeth and it starts digging immediately.



Load moving to rear shifts center of balance, automatically levels off the bucket, brings bucket up, ready for hoist.

## Page "AUTOMATIC'S" DIGGING ACTION Means More Production

Watch a Page Automatic work — see how it loads full in 1½ to 2 bucket lengths — break out for a fast hoist and you'll see why production-wise owners and operators choose an Automatic every time.

The automatic action built into every Page AUTOMATIC Dragline Bucket gives owners what they want — MORE PRODUCTION PER DAY... year in and year out in every kind of digging at any depth. We can prove the superiority of a Page Automatic on your own machine. There's no obligation. Write for details and Bulletin GPB-554.

**PAGE ENGINEERING COMPANY**  
CLEARING POST OFFICE • CHICAGO, ILLINOIS

**Page**  
**Automatic Dragline**  
**Buckets**  
**Walking Draglines**

*If it's a Page... It DIGS*

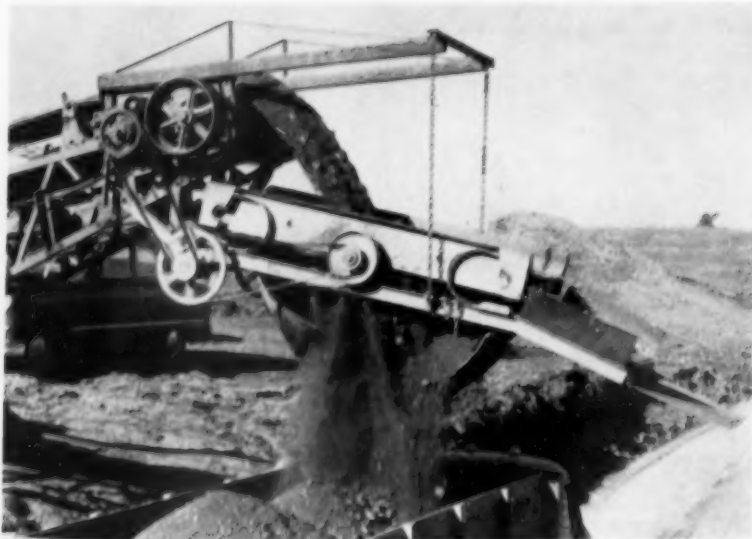
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ROCK PRODUCTS, August, 1956

231

# Kolman Vibrating Screens Are Easily Installed on Any Conveyor



Now you can readily convert your present conveyor into an efficient, low-cost Conveyor-Screen loading and screening plant.

Regardless of the make or size of your existing conveyor, there is a KOLMAN Screen to suit your application. Installation is easy because the UNIVERSAL MOUNTINGS are designed to permit use on any make conveyor or bucket loader. Only a SIMPLE DRIVE ARRANGEMENT from a power source on your conveyor to the screen jack shaft is necessary, as shown in the photo above. A HEAD PULLEY CLUTCH IS OPTIONAL equipment to provide for separate operation of belt and screen. However, this clutch is not essential for proper operation of the screen.



WRITE FOR PRICES  
AND LITERATURE

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## WHY KOLMAN SCREENS ARE IDEAL FOR CONVEYOR INSTALLATIONS—

### Floating Action!

Freedom of action that gives full vigorous vibration for clear, accurate separation without clogging or blinding.

### Minimum Vibration Transfer!

Force of vibrations is not transmitted to screen frame to damage other equipment or screen itself!

### Compact Design!

More screening capacity per square foot than most competitive screens. Added ease of installation.

### Folding Feature!

Single-deck KOLMAN screens fold under conveyor without disassembly for ease in transportation.

### Priced Right!

Design permits rugged construction without bulky, expensive weight. Few moving parts help keep maintenance costs low for long-run economy.

## KOLMAN MANUFACTURING CO.

4200 W. 12th St.

Sioux Falls, S.D.

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RECOGNIZED AUTHORITY  
OF THE  
NON-METALLIC  
MINERALS INDUSTRY

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plant stories  
are written to  
help you operate  
more efficiently . .

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advertising  
can help you  
too! See the  
Advertisers'  
Index in back.

sales offices at Chicago, Denver, Kansas City, St. Louis and Minneapolis, with headquarters at Chicago. Mr. Wentworth is sales manager of the central region, with headquarters at Cleveland, and is responsible for the district sales offices at Buffalo, Cincinnati, Cleveland, Detroit and Pittsburgh.

H. K. Porter Co., Inc., New York, N. Y., has announced the appointment of Charles L. Holbert as executive vice-president to succeed Clarence R. Dobson who has retired but will serve as a consultant. Mr. Holbert was formerly a vice-president.

Hercules Powder Co., Wilmington, Del., announces that Kenneth N. Baker has been appointed assistant manager of the Birmingham, Ala., office, to succeed Allen S. Crowley, who has been named assistant manager of the Joplin, Mo., office. Mr. Baker was formerly technical service representative of the explosives department at Birmingham.

Fairbanks, Morse & Co., Chicago, Ill., announces the following appointments: L. A. Weom, manager of the pump sales division, Kansas City, Kan., succeeding the late Tom E. Woodruff; J. R. Walsh, manager of materials and schedules at Beloit, Wis., works; G. R. Anderson, manager of Kansas City works; A. H. Hoffman, manager Freeport, Ill., works; V. E. Johnson, manager of the Westco works in St. Louis; and J. S. Peterson, manager of electronic sales, scale division.

Thor Power Tool Co., Aurora, Ill., has announced the election of Frank J. Weitekamp as secretary to succeed John A. McGuire, vice-president and chairman of the executive committee. Mr. Weitekamp is also comptroller of the company and treasurer of the Thor Speedway Division. Announcement has also been made of the opening of a new Kansas City sales and service branch in charge of E. C. O'Connell, formerly manager of the San Francisco branch.

Baughman Mfg. Co., Jerseyville, Ill., has appointed C. L. Cousins as western district sales engineer in the territory west of the Mississippi River and east of Denver. He was formerly with Allied Builders Supply Co., Springfield, Ill. Bruce Walsh has returned to the eastern sales division as eastern district sales engineer. He was transferred to the western division in 1952.

Le Roi Division, Westinghouse Air Brake Co., Milwaukee, Wis., announces a \$5.5 million engineering and research program at the Milwaukee plant during the next five years. The plant produces portable and stationary air compressors and internal combustion engines.

Link-Belt Co., Chicago, Ill., has announced the election of Richard E. Whinrey as vice-president. He has been general manager of the Ewart plant since 1951 when he succeeded Robert C. Becherer, who was elected executive vice-president prior to his elevation as president of Link-Belt Co.

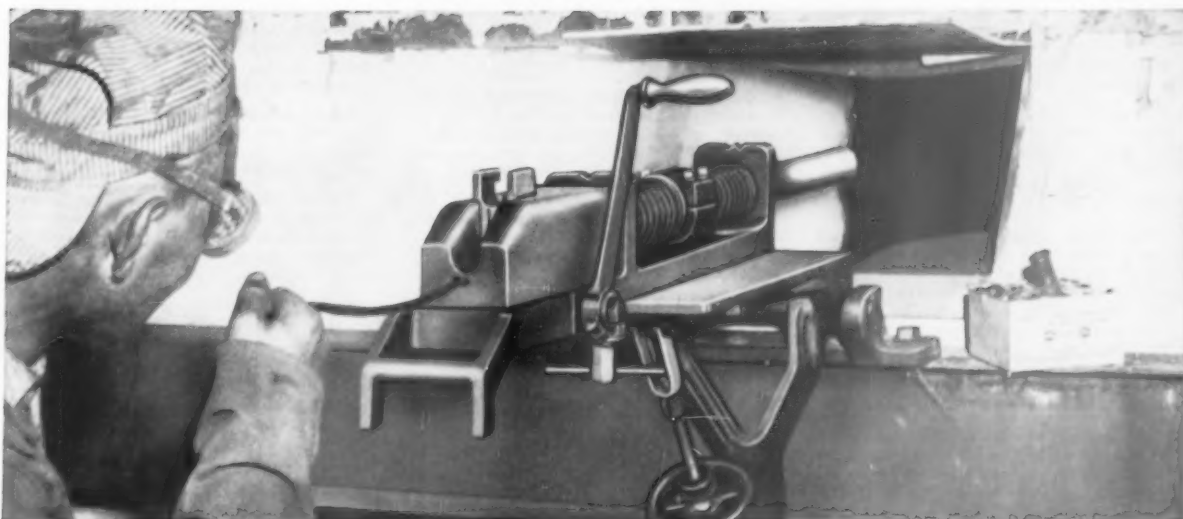
L. A. Young Spring & Wire Corp., Detroit, Mich., has purchased the assets of the Woodside power loader division of Woodside Industries, Milwaukee, Wis., and it is planned to transfer manufacturing operations to the Daybrook hydraulic division at Bowling Green and Upper Sandusky, Ohio.

The Master Builders Co., Cleveland, Ohio, has announced availability of a colored motion picture on concrete quality control entitled "The Man with the Trowel," which shows how pozzolith is being used as an aid in obtaining better, uniform quality concrete.

Simplicity Engineering Co., Durand, Mich., announces the appointment of Richard A. Alshire, Whittier, Calif., as sales and engineering

(Continued on page 234)





# Time cut 112 to 1 in removing kiln rings with the REMINGTON INDUSTRIAL GUN



**VARIOUS MOUNTINGS ARE POSSIBLE** with the Industrial Gun. Here's one of the most common: secure a 6" or 8" "I" beam across the face of the kiln and simply hook the mount into the bolster. The gun can also be mounted on a truck, a tripod, or a mobile chassis for shooting down obstructions in mines or quarries.

## 26 hours per month production time gained by refractory plant

"We save 222 man-hours per month—and gain 26 hours' production time!" That's how the superintendent of a large refractory plant in Georgia sums up the reasons he's sold on the Remington Industrial Gun. Formerly, removal of kiln rings took 8 men an average of 28 hours per month. Two men now do the same job *in one hour*.

Hundreds of plants have found the industrial gun to be the fastest, most efficient method for ring removal. In seconds, one man can aim, load and fire the gun. A few shots loosen the ring . . . cause it to crumble when the kiln is rotated. There's never any need to cool and reheat the kiln. *Downtime is cut to a minimum!*

Use of the Remington Industrial Gun can mean big savings in labor, big gains in production for you. Our technicians will be glad to work with you on ring-removal problems at your plant. Just send the coupon for a free illustrated folder with complete information.

*"If It's Remington—It's Right!"*

**Remington** 

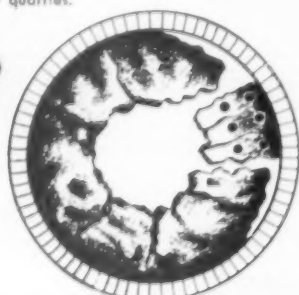
Industrial Sales Division  
Remington Arms Company, Inc.  
939 Barnum Ave., Bridgeport 2, Conn.

Please send me your free folder describing the Remington Industrial Gun.

Name \_\_\_\_\_ Position \_\_\_\_\_  
Firm \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_



**REMINGTON INDUSTRIAL SHELLS** have tremendous smashing power. They're loaded with a powerful 3-ounce lead projectile that develops 7,475 foot-pounds' muzzle energy.



**CUTTING A "KEY-WAY."** A few well-placed shots loosen a section of clinker. The ring is weakened by this loss of the arch key . . . will usually fall without additional shots when the kiln is rotated.

representative on the Pacific Coast. He was formerly with Brown-Bevia Co., where he designed and sold screening and crushing plants. W. E. Minich & Associates, Tampa, Fla., has been appointed distributor in the Florida area.

**General Electric Co.**, Syracuse, N.Y., has announced plans to construct a new plant near Gainesville, Fla., for the communication equipment section that will provide more than 300,000 sq. ft. of space for manufacturing facilities.

**Borg-Warner Corp.**, Chicago, Ill., and York Corp., York, Penn., have unanimously approved the affiliation of the two companies whereby Borg-Warner will succeed to all assets and assume all liabilities of York and each York common shareholder will receive one-half share of Borg-Warner common stock for each one share of York common stock. In addition, York common shareholders would receive \$2.00 in cash for each share of York common stock.

**The Lincoln Electric Co.**, Cleveland, Ohio, has announced an \$8 million expansion to its plant capacity for manufacturing arc welding machines and electrodes in Cleveland, Ohio, also in France, Australia and Canada.

**Fuller Co.**, Catasauqua, Penn., has opened a new office in Kansas City, Mo., located at 20 On The Mall, Prairie Village. David W. Armstrong, formerly district manager, is manager of the new office.

**Atlas Powder Co.**, Wilmington, Del., has made the following appointments: Albert W. Strahorn, director of explosives production; Henry T. Clark, planning assistant to D. J. C. Coppa, vice-president in charge of explosives; and Lewis T. Marks, Jr., head of the chemical control section.

**H. F. Goodrich Co.**, Akron, Ohio, announces that William S. Richardson, president, was

recently elected chairman of the National Highway Users Conference, succeeding Albert Bradley, chairman of the board of General Motors Co.

**Baker-Rauland Co.**, Cleveland, Ohio, has announced the appointment of E. E. McVeigh as manager of sales engineering. Mechanical Handling Co., Seattle, Wash., has been appointed distributor in Seattle and western Washington.

**Fulton Bag & Cotton Mills**, Atlanta, Ga., has accepted an offer by Shuford & Associates, Atlanta, to purchase Fulton stock at \$20 per share. The offer has been submitted to all Fulton stockholders.

**Aquadyme Corp.**, New York, N.Y., has moved into a new plant and office building on Terminal Ave., Clark, N. J.

**Erie Strayer Co.**, Erie, Penn., has announced the appointment of Hugh C. Riley as district representative for Erie clamshell buckets in western New York, western Pennsylvania, West Virginia, Kentucky, Ohio, Michigan, Indiana, northern Illinois and Wisconsin.

**Ludlow-Saylor Wire Cloth Co.**, St. Louis, Mo., is celebrating 100 years of progress and service to the woven wire cloth and screen industry.

**Nopco Chemical Co.**, Harrison, N. J., announces the appointment of D. E. Murphy to the technical sales staff of the Southern California sales district, Los Angeles, Calif.

**SKF Industries, Inc.**, Philadelphia, Penn., has elected Stuart H. Smith, general sales manager, as a director of the Tyson Bearing Corp., Massillon, Ohio, a subsidiary. He replaces William S. Mahoney, who has resigned.

**St. Regis Paper Co.**, New York, N.Y., has moved its offices to 150 E. 42nd St., New York, N.Y.

**The Dracoo Corp.**, Cleveland, Ohio, manufacturers of dust collection systems and Airstream conveyors, announces the appointment of the Horrell Co., Los Angeles, Calif., as sales representative in Southern California.

**General Refractories Co.**, Philadelphia, Penn., announces that its subsidiary, General Refractories Co. of Canada, Ltd., plans construction of a plant at Smithville, Ontario, Canada.

**Flexible Steel Lacing Co.**, Chicago, Ill., has appointed Al Gladding as sales representative in the northeastern states to succeed Les Coleman who has been transferred to the Chicago sales department.

**Combustion Engineering, Inc.**, New York, N. Y., announces that H. G. Ebdon, vice-president and general sales manager, has been named executive vice-president.

**Macwhyte Co.**, Kenosha, Wis., has established a new office and warehouse on 75 Oakman Blvd., Detroit, Mich.

**American Air Filter Co., Inc.**, Louisville, Ky., has announced the appointment of Hugh H. Mallanay as sales engineer for the Chicago area. He was formerly in the Chicago branch office of the Herman Nelson division of the company.

**Blaw-Knox Co.**, Pittsburgh, Penn., announces that Richard S. Connolly, formerly sales engineer with the heavy steel forms department, has been named assistant sales manager of the department.

**McDowell Co., Inc.**, Cleveland, Ohio, announces that enlarged facilities of the Dwight-Lloyd Research Laboratory are now in full operation at the Dwight-Lloyd division in Cleveland. Equipment at the new laboratory, which is designed as a complete pilot plant, permits crushing, sizing and screening, pel-

(Continued on page 236)

## FOR ACCURATE FEED CONTROL BY WEIGHT **MERRICK** IS TOPS

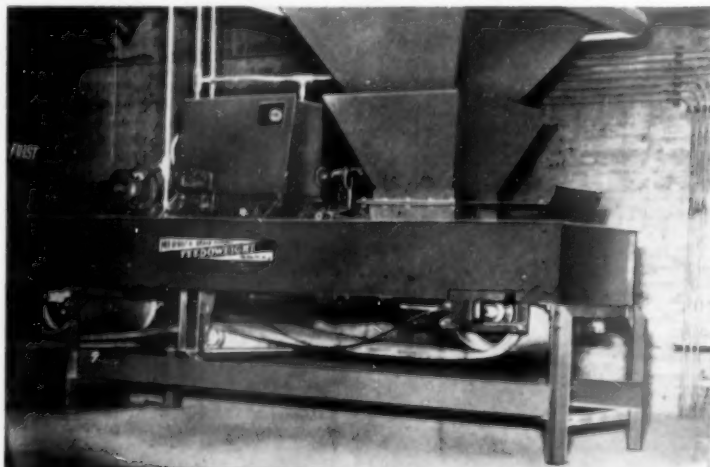
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Yes! Better than 50% of the Major Cement Producers in the United States rely on Merrick Feedoweights to blend, proportion and feed to process, by weight, such cement components as Clinker, Gypsum, Shale, etc., to produce high uniformity of product.

The Feedoweight is also extensively used in Cement and Ore Processing Plants in Canada, Mexico, South America, The Middle East, Africa, China and the Scandinavian Countries of Europe.

Investigate the Merrick Weightometer® for Continuous and Automatic Weighing on Belt Conveyors.



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180 AUTUMN STREET • PASSAIC, NEW JERSEY

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Bulletins 253 and 375  
available on request

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# "WE CONSIDERED MANY PLANTS WE CHOSE AN **ERIE** AUTOMATIC BATCHER"



## ● REPORTS CLINTON KELLER, VICE-PRES. READY-MIX CORP. OF COLORADO SPRINGS

It takes some real doing to make a decent profit in the highly competitive ready-mix concrete business. You can turn out good specification concrete and still lose your shirt—unless top-quality goes hand-in-hand with efficient, high-volume production.

Ready-Mix Corporation took a long, hard look at these facts before buying a concrete batching plant. They selected the ERIE plant, shown above, with **AUTOMATIC** controls for batch **CEMENT** AND **AIR OPERATE GATES** FOR **AGGREGATE**.

Here's what company officer, Clinton Keller, says about their fast working **ERIE** Truck Mixer Plant. "After considering a number of plants, we decided on an **ERIE**. We felt it would give us more concrete, faster, and would require fewer men to operate. Our **ERIE** plant has been in operation several months now. It's everything we thought it would be. We're highly pleased!"

### Plus Features **ERIE** PLANT Provides

1. One-man operation for efficient, profitable production.
2. Faster batching and discharging cycle with free flow of materials from bins to batcher.
3. Choice of controls from either mechanical or from proven electronic batching with mechanical option.
4. Precision Batchers for weighing and mixing concrete that easily meet highway department specifications.

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STRAYER  
COMPANY**



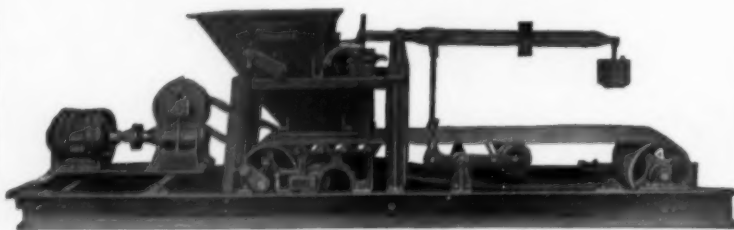
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ROCK PRODUCTS, August, 1956

235

# Bulk Material Processors BOOST PROFITS WITH SCHAFFER POIDOMETERS

OVER 1400 INSTALLATIONS SHOW WHY



Year in . . . year out, Schaffer Poidometers show dollar and cents superiority in weighing, feeding, recording, proportion, mixing, and blending of raw and finished bulk materials.

Operating is easy. It's fast, automatic, too. And, you can't beat the accuracy.

That's why you, too, can cut costs, increase production.

Schaffer poidometers are available with total weight, recording, and control weighing and recording devices.

Write for Catalog No. 6

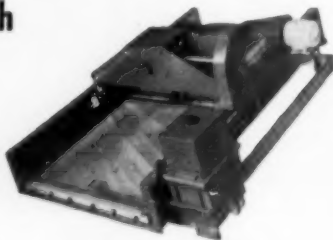
**SCHAFFER POIDOMETER CO.**

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Pittsburgh 22, Pa.

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## For Difficult Fine Mesh Damp Screening

For the screening of damp or sticky materials such as silica sand, lime or ag-lime, the Leahy® Vibrating Screen with FlexElex heating of the jacket is unexcelled. Differential vibration snaps wedging particles loose and FlexElex keeps the mesh dry and wide open for accurately sized, full capacity production. Ask for Bulletin 16-EH. It may save thousands of dollars for you.



Made by the Original Deister Co.  
Incorporated 1906

**The DEISTER CONCENTRATOR COMPANY**

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## PLATEGRIP

PLATE FASTENERS FOR CONVEYOR BELTS



Make strong dust-tight, water-tight joints in belts of any width. Special design spreads tension uniformly across belt, allow natural troughing of belt and assures smooth operation over flat, crowned or take-up pulleys. Sizes for belts of from 1/4" to 1 1/2" thickness. Write for Catalog Sheet.

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## CONTRACT CORE DRILLING

EXPLORATION FOR MINERAL DEPOSITS  
INCLUDING URANIUM & LIMESTONE — ANYWHERE

FOUNDATION TEST BORING

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Skilled crews and complete stock of core drills  
and accessory equipment maintained at all times

Core Drill Contractors for more than 60 years

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Contract Core Drill Division  
MICHIGAN CITY, INDIANA

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letizing, head-hardening of pellets, sintering, blending of materials, strength analysis of processed minerals, drying and calcining, etc. One of the main projects at the laboratory which grew from the work of Col. A. S. Dwight and R. L. Lloyd, is research into the conversion of fly ash to lightweight aggregate to render it suitable for lightweight aggregate block.

**Goodyear Tire & Rubber Co.**, Akron, Ohio, has named H. F. Schweitzer as Charlotte, N. C., district manager of the industrial products division. He has been serving as a field representative in the Chicago office and succeeds R. J. Ario, who has been promoted to manager of the division's Cleveland district.

**Hyster Co.**, Portland, Ore., has announced plans to construct a new plant in Danville, Ill.

**Joy Mfg. Co.**, Pittsburgh, Penn., has appointed A. B. Drastrup as vice-president. He was formerly president of the A. M. Byers Co.

**Koehring Co.**, Milwaukee, Wis., announces plans to acquire the Hydraulic Press Mfg. Co., Mount Gilead, Ohio, for an amount in excess of \$5,000,000, subject to ratification by stockholders of both companies.

**Mead-Morrison Division** of McKiernan-Terry Corp., Harrison, N. J., has announced the appointment of James L. Hamilton, Jr., as a sales engineer in the Chicago office.

**Magie Chemical Co.**, Brockton, Mass., announces acquisition of the Peerless Cement Co., manufacturer of industrial adhesives.

**Mack Motor Truck Corp.**, division of Mack Trucks, Inc., Los Angeles, Calif., has appointed Stanley J. Coffey as western sales representative. He was formerly sales manager for Cummins Diesel Sales of Oregon.

**The American Pulley Co.**, Philadelphia, Penn., has opened a new warehouse at 800 Fifty-first Ave., Oakland, Calif.

**Lincoln Engineering Co.**, St. Louis, Mo., designer and manufacturer of lubricating equipment, has merged with The McNeil Machine & Engineering Co., Akron, Ohio, and will become the Lincoln division of the company.

**Mixermobile Manufacturers**, Portland, Ore., has announced the appointment of Wayne Hardy as district representative for the 14 midwestern states, with headquarters in Portland, Ore.

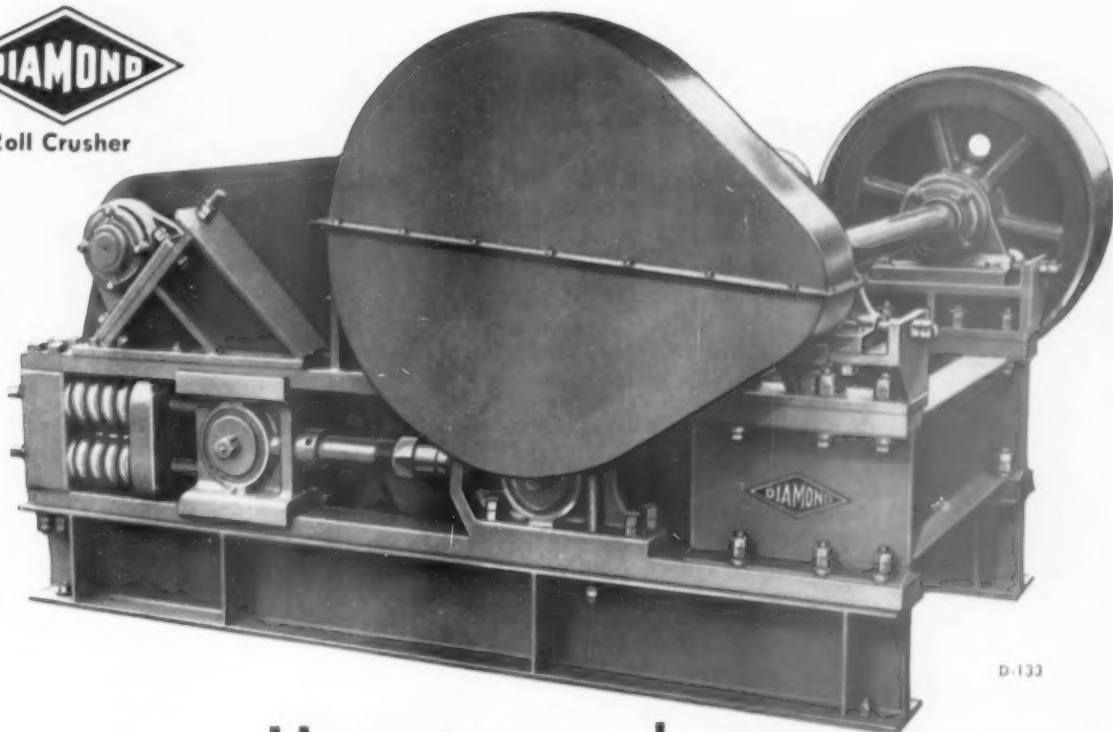
**Union Asbestos & Rubber Co.**, Chicago, Ill., has sold its heating division to Batavia Kritzer, Inc., Batavia, Ill.

**Modern Engineering Co.**, St. Louis, Mo., announces the appointment of David D. May as sales representative for the welding and cutting divisions in the south-central states, with headquarters in Memphis, Tenn.





Roll Crusher



## How to produce small aggregate at lowest cost —

No other unit is as effective for producing small aggregate as a Diamond Roll Crusher. This is particularly true when it is used to process over-size aggregate produced by preceding crushers.

Doubt it? All right . . . just compare the following advantages of a Diamond with other types of crushing equipment:

- Greater capacity of material for its weight
- Requires less h.p. per ton produced
- Freedom from stresses
- Simple maintenance, effective lubrication

There's more, too. All Diamond units are provided with heavy tension springs to hold the floating roll and to permit quick opening in the event of overloading or in case uncrushable materials stray into the rolls. This protects shells and other parts against damage.

Accessible mechanism and ease of adjusting the opening between the roll shells allow the size of the product to be changed at will.

See what we mean? Diamond Roll Crushers are earning their keep—contributing to profits, too—in pits, quarries and on construction jobs. Available in roller bearing design, star gear or chain drive, and plain bearing design, chain driven. Roll sizes: 16x16, 24x16, 30x18, 30x20, 36x22, 40x22. Get full details today . . . no obligation.



### DIAMOND IRON WORKS

DIVISION  
GOODMAN MANUFACTURING COMPANY  
Roll Crushers • Jaw Crushers • Conveyors • Screens and Washers  
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Portable and Stationary Crushing Plants for Rock and Gravel  
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City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

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## MORE AND MORE CEMENT PLANTS USE BLAW-KNOX BUCKETS

to meet the stepped-up requirements in handling  
CLAY • LIMESTONE • CEMENT CLINKER

Blaw-Knox bucket engineers have had many years of worldwide experience in the design and application of buckets for the cement industry.

This expert engineering service is available to you without obligation for the purpose of analyzing your operating problems and helping you select the proper size, weight and type bucket to meet your stepped-up requirements.

In all probability, we have already had experience in solving problems that may be puzzling you. Write for this free service.

Write for Bulletin 2378 for complete information, construction details and specifications.



Size 720-S rated 1 1/4 yd.  
BLAW-KNOX Bucket Handling Limestone and Clay.



## BLAW-KNOX CLAMSHELL BUCKETS FOR THE CEMENT INDUSTRY

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BLAW-KNOX EQUIPMENT DIVISION  
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Offices in Principal Cities

SPRAYING SYSTEMS CO.

## SPRAY NOZZLES

performance-proved  
for every operation

Improve the quality of spraying operations by exact control of spray pattern and impact in washing . . . and by more accurate distribution of spray in wetting-down operations. Patented designs plus the widest choice of types and capacities in the industry, permit exact selection to fit your needs.

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Complete forty-eight page catalog with full specifications on all spray nozzles . . . plus handy tables on pipe frictions and spray coverage.

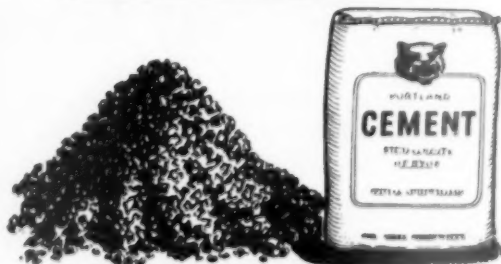


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## OF FUEL-to-CEMENT

In these days of increasing fuel and labor costs, every economy you can make is important. Here is a sure way to **SAVE FUEL**. Cambridge Gas Analyzers will provide the burner with a continuous and simultaneous record of the oxygen, carbon dioxide, and combustibles in the flue gas. O<sub>2</sub> analysis serves to warn against excessive air supply; combustibles analysis indicates oxygen demand under all conditions; CO<sub>2</sub> analysis reflects state of calcining process. Cambridge Instruments make uniform kiln operations possible with ease. Savings effected pay for installation in short time.

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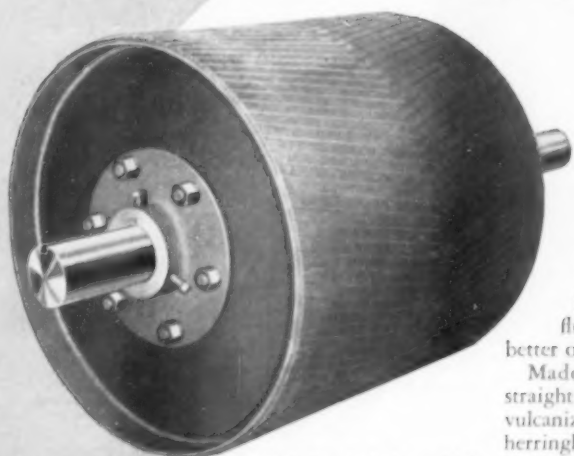
CAMBRIDGE INSTRUMENT CO., INC.  
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PIONEER MANUFACTURERS OF PRECISION INSTRUMENTS  
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**LINK-BELT** assembles pulley on  
shaft—insures correct keyseat alignment

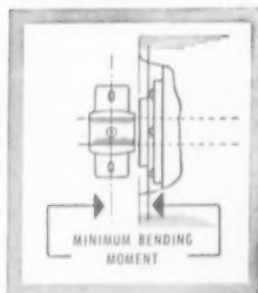


Link-Belt line includes welded steel and gray iron pulleys as well as welded steel slat pulleys.

**Y**ES, you get a two-way dividend because Link-Belt mounts belt conveyor pulleys on their shafts at the factory. What's more, the flush-hub construction means better operation.

Made with either crowned or straight face, they are available with vulcanized lagging, either plain or herringbone. Your choice of bolted or taper lock hubs.

You can get complete information on belt conveyor pulleys from your Link-Belt salesman. Call him today.



Flush hubs minimize shaft deflection, cut hub bolt stress and disc deflection.

## LINK-BELT

WELDED STEEL CONVEYOR PULLEYS

13,424-A

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office: New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World.

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## Two-Tone MANGA-TONE N.M. rebuilds Crusher Rolls

**Faster - Less  
Cost per Pound**

The TWO-TONE process which deposits greater thicknesses of metal and more pounds per hour than any other method of welding can easily prove to be the answer to your roll rebuilding. It is a simple matter for a good welder to consistently lay down welds  $1\frac{1}{2}$ " wide and  $5/16$ " thick and average 12 pounds of deposited metal per hour.

There is no further need for a welder to work extremely hard and fast, in order to average a puny 5 pounds of weld metal per hour, using the old-fashioned method of the single electrode. Better yet, in addition to the labor factor, the actual deposited metal in a MANGA-TONE weld is generally LESS PER POUND than most of the so-called manganese rebuilding metals.

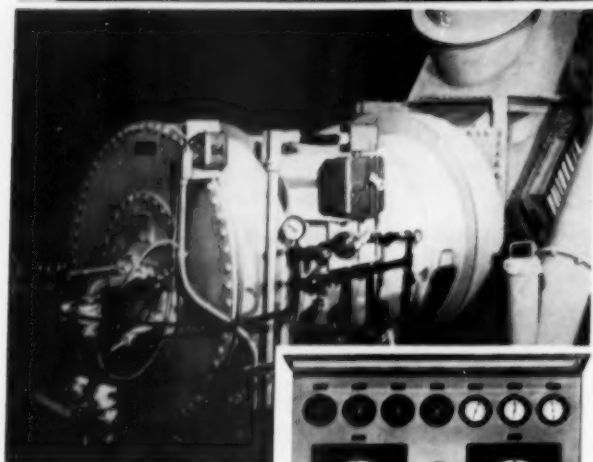


In the illustration, note the great width of the single pass of the deposited MANGA-TONE. Furthermore, a properly applied deposit of MANGA-TONE on a good manganese casting will resist both abrasion and impact about 40% better than the parent casting metal. For proof, call in our field man.

**THE RESISTO-LOY CO. INC., Grand Rapids 7, Michigan**

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**TODD** DESIGNED  
FOR AIR HEAT  
ECONOMY



"TODD THERMO" Heated Air Furnace installed at Missouri Portland Cement Co., for firing gas and fuel oil. Capacity approx. 10,000,000 BTU-HR.

## CEMENT AND ROCK INDUSTRY

### *Thermo* COMBUSTORS

These high heat release furnaces utilize many newest gas turbine and jet engineering principles. Streamlined, high efficiency operation for

- DRYING IN MECHANICAL SEPARATORS
- DRYING IN CRUSHING MILLS
- FURNISHING HEAT TO ROTARY DRYERS

Package design . . . low space requirements . . . low maintenance . . . trouble-free performance. This complete money-saving system available for firing all types of oil and gas.

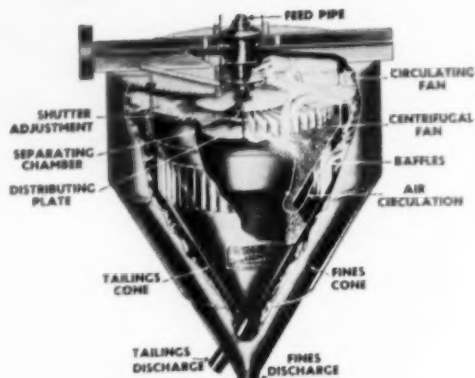
Write for full details to  
Products Division

**TODD** SHIPYARDS  
CORPORATION

HEADQUARTERS: Columbia and Hallock Streets, Brooklyn 31, N. Y.  
PLANT: Green's Bayou, Houston 15, Texas

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## The "HEART" of the MODERN CEMENT PLANT



## RELIANCE-GAYCO *Centrifugal* SEPARATOR

GAYCO Separators are a vital factor in manufacturing high early strength cement, insuring a premium product of specified surface area and uniformity.

Consider these advantages of GAYCO:

- Exclusive GAYCO sizing fan gives closer separations
- Range 60 to 400 mesh
- Undesirable oversize rejected from product
- Higher production because of complete removal of fines
- Cleaner tailings
- Slow speed for slow wear
- Quick and easy adjustments
- Equipped with Timken bearings

Modernize your cement plant with GAYCO Separators for extra-efficient operation, with maximum output and profits.

Let Gayco engineers give you the benefit of their many years' experience.

**UNIVERSAL ROAD MACHINERY CO.**

Factory and Laboratory, Kingston, N. Y.

117 LIBERTY STREET

NEW YORK 6, N. Y.

Canadian Representative: Watson Jack-Hopkins Limited  
8500 Decarie Blvd., Montreal, Que.

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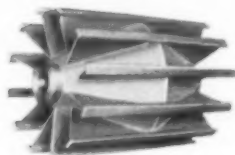
# STANDARD

## ELEVATING AND CONVEYING EQUIPMENT

- Greater Strength •
- Longer Life •
- Lower Cost •

### CONTINUOUS ELEVATOR BUCKET STYLE No. 2

Put this Standard Bucket to work handling the toughest materials, and it takes the job right in stride—resisting abrasion, corrosion and wear. This bucket is typical of the complete line of low cost, rugged Standard Steel Buckets — available in Salem, Style "A," shelf type and other continuous style buckets.

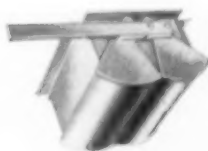


### STANDARD WING TYPE SELF-CLEANING PULLEY

The most severe operating conditions won't bother this Standard Pulley because its all-steel welded construction gives it far greater strength and resistance to breaking. And yet it weighs less . . . costs less.

### STANDARD BIN GATE

Profit from faster, easier material handling made possible by this gear-operated all-steel Standard Bin Gate. Other styles in Standard Bin Gates also available.



For lower maintenance and material handling costs, convert to Standard. Write today for catalog showing the complete Standard line.



**STANDARD METAL MFG. CO.**  
110 CENTER ST. MALINTA, OHIO

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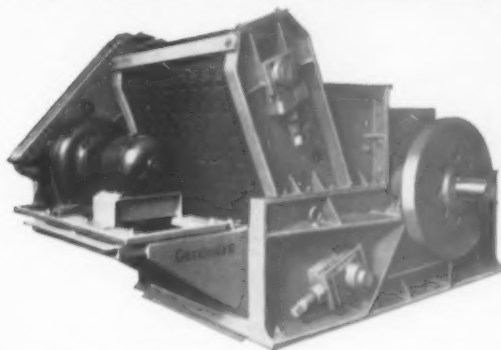
FAMOUS GRUENDLER HAMMERMILLS—"SINCE 1885"

## Accelerate production of Ball or Compeb Mills

with dependable Gruendler Equipment

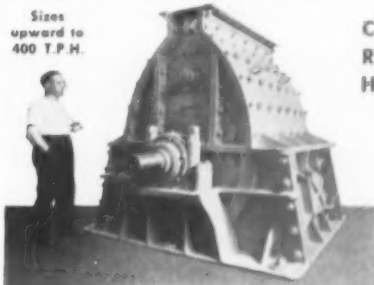
Turn out more barrels of cement at minimum expenditure

Get the facts about the **GRUENDLER HAMMERMILLS**



**SWING-HAMMER CRUSHER WITH TRAVELING BREAKER PLATE**—a satisfactory method in handling wet sticky rock, ores, shale. Choice of 5 sizes up to 600 T.P.H.

Sizes  
upward to  
400 T.P.H.



### CENTER-FEED REVERSIBLE HAMMER CRUSHER

for still finer reduction, greatly increasing Ball or Rod Mill capacities, very often to as much as 25%

### HEAVY DUTY HAMMER CRUSHERS

Take the biggest loads. Immense capacities. For Primary, Secondary crushing and Fine Grinding.



In sizes for  
every production  
requirement.

Write to Dept. RPB for Bulletin

# GRUENDLER



**GRUENDLER CRUSHER  
and PULVERIZER CO.**  
2915-21 N. Market St.  
St. Louis 6, Mo. U.S.A.

Manufacturers: ROLL CRUSHERS—JAW CRUSHERS  
PORTABLE CRUSHING UNITS—SCREENS—AUXILIARIES

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## CUT TIME AND LABOR COSTS

on "secondary breakage"

with **FREDERICK CAST semi-steel DROP BALLS**



Eliminate costly, time-consuming drilling or blasting with this low-cost production tool. Rugged, durable Frederick Drop Balls provide you with quick, easy crushing power where you want it—when you want it, with little or no maintenance. Frederick's exclusive "pear-shaped" design withstands greater impact and gives straighter "pin-point" drops. Exclusive "E-Z Swing" steel eye is recessed to prevent excessive ball movement and keep hook in place. Nickel alloy is standard on balls 4000 lbs. or over—or, we'll be glad to quote on special alloys if desired.

Balls can be furnished with replaceable pins, if requested. Special release hooks for free dropping are also available.

Write us today for prices and illustrated literature. Order Balls direct or from your Equipment Dealer.

### Wide Range of Sizes and Weights:

Pear shape (lbs.).....	1500	2000	3300	4000	5200	6500	8000
Ball shape (lbs.).....	300	1000	2000	5200			
Spherical shape (lbs.).....	470	950	1650	2400	3000	3700	5400
(for magnet use)							

## FREDERICK IRON & STEEL, INC.

FREDERICK Established 1890 MARYLAND

Phone: MOunument 2-5111

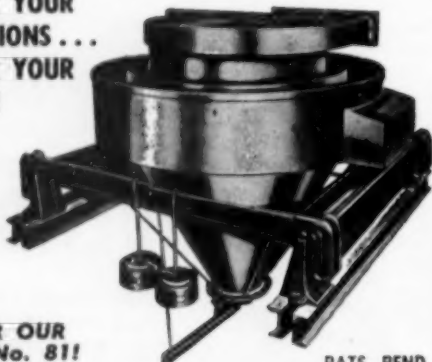
CENTRIFUGAL PUMPS • MUNICIPAL AND GRAY IRON CASTINGS  
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## AUTO VORTEX CLASSIFIERS...

MOST EFFICIENT BY ANY MEASURE  
FOR SINGLE OR MULTIPLE SPLITS!

COMPARE RESULTS . . . COMPARE COSTS . . .  
AGAINST ANY OTHER SAND GRADATION EQUIPMENT! AFTER SUCH COMPARISON, YOU, TOO, WILL BUY AUTO-VORTEX CLASSIFIERS . . .

WHATEVER YOUR SPECIFICATIONS . . .  
WHATEVER YOUR PROBLEMS!



PATS. PEND.

WRITE FOR OUR BULLETIN No. 81!



## CHARLES E. WOOD COMPANY

906 NORTH WATER ST. • MILWAUKEE 2, WISCONSIN

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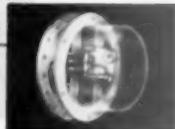
## BULK MATERIAL CONTROL

under  
Pressure or Vacuum

New Roto-Bin-Dicator mounts outside bin, at any angle, for bin level signaling or machinery control. Material loads on paddle actuate Micro switch in motor housing. Flexible paddle shaft permits use with large or lumpy materials. Explosion-Proof U. L. Listed Units Now Available.



**BIN-DICATOR**  
**BIN-FLO AERATOR**



Low pressure air diffuser assures steady flow of fine, dry materials that tend to pack in storage.

The original diaphragm-type bin level indicator for all ordinary applications.

Complete  
Illustrated  
Literature  
FREE

## THE BIN-DICATOR CO.

13946-F Kercheval • Detroit 15, Mich.

Phone: VALley 2-6952

WE SELL DIRECT • PHONE ORDERS COLLECT

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## WOVEN WIRE SCREENS

ACCURATE • DURABLE • ECONOMICAL

The reliability of T.C. Alloy Screens has carried them into all parts of the world. Made in Standard and Special Weaves, with Square or Oblong Openings—from 10 mesh, .035" wire on up. Write today for Catalog No. 53.

## TWIN CITY IRON & WIRE CO.

35 W. WATER STREET • ST. PAUL 1, MINNESOTA

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### This "No Contact" feature

REDUCES  
UP KEEP

\$ \$ \$

SAVES YOU  
MONEY



In a Hayward, there's no contact between the closing mechanism and the material handled. This means much less wear, reduced up-keep, big savings in bucket maintenance. THE HAYWARD COMPANY, 50 Church St., New York 7, N.Y.

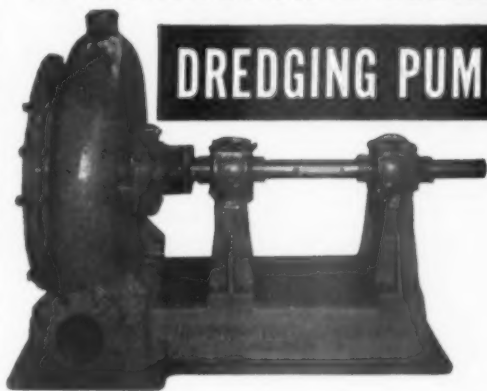
## HAYWARD BUCKETS

CLAM SHELL • ELECTRIC • ORANGE PEEL • GRAPPLES  
famous for performance since 1888

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## HETHERINGTON & BERNER

### DREDGING PUMPS



performance-proven on the toughest jobs



Hetherington & Berner sand and gravel pumps are available in two general types: *STANDARD*, (4", 6" and 8" sizes) with semi-steel parts, for ordinary working conditions and moderate heads; and *DREADNAUGHT*, (6", 8", 10", 12" and 15" sizes) with manganese steel parts, for heavy duty jobs with stringent head conditions.

Write for Bulletin DP-147.

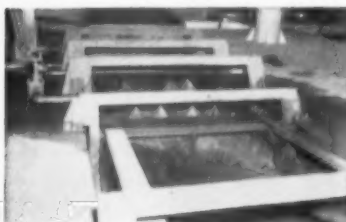
**HETHERINGTON & BERNER INC.**

755 Kentucky Ave.

Indianapolis 7, Indiana

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## Dewatering Screens



**HIGH-SPEED** dewatering screens are designed, built and installed by McNally Pittsburg, and operating throughout the Western World.

To Basic Industries  
McNally Pittsburg Offers:

— **SERVICES** —  
Research & Development  
Engineering Design  
Field Erection

— **EQUIPMENT** —  
Roller Chain  
Rotary Breakers  
Bucket Elevators  
Pumps, Valves, Piping  
Dryers, centrifugal & heat  
Washers, automatic,  
heavy media & jig

Car Dumpers  
Car Hauls  
Conveyors  
Pug Mills  
Crushers  
Screens  
Kilns

**M<sup>C</sup>**

**NALLY PITTSBURG**  
MANUFACTURING CORPORATION

— **OFFICES** —  
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Pittsburgh, Pennsylvania Chicago, Illinois

— **PLANTS** —  
Pittsburg, Kansas Wellston, Ohio

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## The adjustable-speed wedgbelt drive is a Combination...

... of American Adjustable-Diameter Sheaves, allowing stepless speed variation by internal change of pitch diameter. Exclusive *double-taper* hub locks flanges in position, locks sheave to shaft. Positive speed control is assured for crushing, vibrating, grinding and other processing operations.

... of American Wedg-Tite Bushings with exclusive *steeper taper* for fast installation and easy removal, uniform compression, positive alignment, and maximum clamping action on the shaft.

... of American Wedgbelts, mold-cured to vary less than  $\frac{1}{4}$  of 1% in length, with strict uniformity in taper, thickness and width. Dacron® cords in Super-Service Wedgbelts are  $2\frac{1}{2}$  times stronger than rayon, withstand shock loads and high starting torques.



... of American Wedg-Tite Companion Sheaves, precision-matched to the same taper of the bushing, the exact sidewall angle of the belt. Machined to a satin finish, with accurate balance and concentricity, they lower frictional power-loss, increase efficiency.

**THE RIGHT COMBINATION FOR MAXIMUM  
VARIATION OF MACHINE SPEEDS**

\*Reg. T.M. E. I. DuPont de Nemours & Co., Inc.

*The American Pulley Company*

4212 Wissahickon Avenue  
Philadelphia 29, Pa.

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December 24, 1927

Rock Products

# COATES GRINDING MEDIA



## "TUNGSCO" STEEL NUGGETS "CARBEX" FORGED STEEL BALLS

WE are specialists in the business of developing and manufacturing grinding media. And because we are specialists, all of our time and thought is given to concentration on the one question of how to make our one product the best that it can possibly be. As a result of this specialized endeavor, we have developed a line of grinding bodies that we believe are unexcelled anywhere—cost and service considered.

To cement manufacturers we offer two separate and distinct types of grinding media—

each of which has certain peculiar advantages for particular types of grinding problems. These two types are: "TUNGSCO" STEEL NUGGETS and "CARBEX" FORGED STEEL BALLS.  $\frac{7}{8}$ " to 5" diameter.

If you will let us know what your grinding requirements are, we shall be glad to submit prices on grinding media of such type, grade and sizes as may be best fitted for your particular grinding problem.

*We carry ample stocks at all times and can make prompt shipment of any grade or size*

CS56-1

**Coates Steel Products Company**  
GREENVILLE, ILLINOIS

**Largest Exclusive Manufacturers of Grinding Media**

### CLAIMS MADE IN 1927 STILL TRUE

The claims we made back in 1927 are still true ... we are still the largest exclusive manufacturers of grinding media. In addition, we have constantly improved our manufacturing methods, over the past 30 years, to give you the best in grinding media. Let us help you with your grinding problems.



# CONCRETE PRODUCTS

A SECTION OF ROCK PRODUCTS

CONCRETE UNITS · READY-MIXED CONCRETE



Patio display of Anchor Concrete Products, Inc., Buffalo, N.Y., for TV program

# SMOOTH as BATTER

The master craftsman knows that he can depend upon Penn-Dixie "One-Package" Mortar Cement because it will always give him the smoothest working mortar for consistently best results.

Easy to work with, it provides the maximum in plasticity, yield and strength. Everything is in the one cost-saving Penn-Dixie package—all cementing, plasticizing and waterproofing materials, pre-mixed for superior, dependable quality and considerable economy.

Just add sand and water, mix it and it's ready for use.

Masons like Penn-Dixie "One-Package" Mortar Cement—start using it on your next job.



**PENN-DIXIE CEMENT**  
*Corporation*

PLANTS: Nazareth, Pa. • Bath, Pa. • Penn-Allen, Pa. • West  
Winfield, Pa. • Buffalo, N. Y. • Richard City, Tenn. • Kingsport,  
Tenn. • Clinchfield, Ga. • Des Moines, Iowa • Petoskey, Mich.  
DISTRIBUTING PLANTS: Chicago • Detroit • Milwaukee  
OFFICES: New York • Chicago • Philadelphia  
Detroit • Boston • Pittsburgh • Milwaukee • Buffalo  
Atlanta • Des Moines • Petoskey, Mich. • Nazareth, Pa.

# INDUSTRY NEWS

## Cover Picture

ON THIS MONTH'S CONCRETE PRODUCTS COVER is shown an attractive patio exhibit of Anchor Concrete Products, Inc., Buffalo, N.Y. Originally designed by Anchor for the Helen Nevills show on WGR-TV, the garden setting has been used for other TV programs. Colored Roman Roughs were used for the patio floor, while colored Celocrete lightweight masonry units were used for the fireplace and the shelf area. This display is a publicity suggestion that other block plants might use very effectively. Some mention of Anchor concrete products is made on each program without any cost to the company.

## Ready-Mixed Test Procedures

NATIONAL READY MIXED CONCRETE ASSOCIATION, Washington, D. C. has available Bulletin No. 66, Sampling and Testing Ready Mixed Concrete. The most recent versions of pertinent A.S.T.M. Standards are appended.

The problems of sampling and testing ready-mixed concrete are of outstanding importance, particularly in the case where acceptance is based on strength.

## F.T.C. Rules Set

TRADE PRACTICE RULES for the Brick and Structural Clay Tile and Allied Products Industry are now in effect. The rules are directed to the elimination and prevention of unfair trade practices and cover those who manufacture, sell or distribute any type of building material that is or is represented to be brick or structural tile.

Under the rule, no products shall be designated as "brick", "tile" or "structural tile" unless the composition is primarily clay and/or shale and the ingredients have been fused together by the application of heat. However, such designations may be used if qualified to denote the basic composition—i.e., "concrete brick", "corral brick", "plaster brick", "sandlime brick", "concrete structural tile"—or when, in immediate conjunction, disclosure is made of the fact that the products are not ceramic products.

## Expanded Aggregate

EXPANDED SHALE CLAY AND SLATE INSTITUTE, Washington, D. C., has investigated the thermal characteristics of concrete and block made from expanded aggregates, Report No. 4. These products have good resistance to passage of heat.

A sheet has also been issued on "Suggested Mix Design for Job Mixed Concrete", Report No. 3.

## A.C.I. To Build

AMERICAN CONCRETE INSTITUTE, Detroit, Mich., will build a headquarters building designed by Minoru Yamasaki. The structure will employ concrete in several forms, and includes an unusual fold-plate reinforced concrete roof system.

Motivation for the new building is said to be A.C.I.'s recent membership growth and increased technical activities. Frank Kerekes, president, and Henry Kennedy, chairman of the A.C.I. Building Committee, announced plans to raise \$275,000 to build the structure, which is pictured below.



A.C.I. headquarters design utilizes a cantilevered roof system that projects over exterior walls of concrete and glass to shield them from the summer sun. Natural light is provided in the central corridor by an unusual system of triangular skylights.

ENGINEERED PRODUCTS, INC., Hialeah, Fla., has started production of a precast floor and roof system, known as Adapt-o-Core. It is a reinforced precast beam with a semi-circular void on each side. The beams are placed side by side on supporting walls to form floors and ceilings, or on the top level, a roof. Donald L. Smith is president of the firm.

THE CAMDEN LIME CO., Camden, N. J., ready-mixed concrete producer, has been licensed by The Flexicore Co., Inc., Dayton, Ohio, to manufacture Flexicore precast concrete building slabs. The company will provide concrete slabs for builders and contractors in the Camden-Philadelphia-Trenton area.

MITCHELL CEMENT PRODUCTS, INC., has been formed in Milwaukee, Wis., with an authorized capital stock of 1250 shares of common at no par value, to manufacture and sell concrete products. Incorporation papers were signed by I. Bagg, naming Neal B. Mitchell as agent.

T. E. RIBBLE of Albuquerque, N. M., has started operations of a ready-mixed concrete plant at the old location of Alexander Sand and Gravel Co. Sand and gravel operations are continuing, along with the addition of the concrete plant.

CONDUIT AND FOUNDATION CORP., Philadelphia, Penn., will build for the City of Philadelphia the Gorgas Lane Bridge of prestressed concrete at a saving of 20 percent of the cost of a similar steel beam bridge.

DODDS AND FOUNTAIN CO., Greggton, Texas, has opened a plant at Tyler. Products will include haydite block, Rane-Bo stone and precast concrete building products.

UNITED STATES CONCRETE PIPE CO., Cleveland, Ohio, has opened a plant in Ft. Lauderdale, Fla., for the manufacture of all concrete pipe types and sizes.

ELKS CONCRETE PRODUCTS, Lafayette, La., has opened a block plant in that city and will produce a large number of sizes.

READY MIX CONCRETE CO., Meridian, Miss., has recently placed in operation Plant No. 2 with a 500-cu. yd. daily capacity.

EVERTRU PRODUCTS CO., Moses Lake, Wash., has been purchased by Washington Brick and Lime Co., Spokane.



**POURING 2300' DOWN A MOUNTAIN IN A 6" PIPE:** To pour anchor blocks for a new 24" water line to Colorado Springs, General Concrete's new Jaeger truck mixers climbed 9700' up Pike's Peak (a 17 mile haul that took about 80 minutes)

then spent 40 minutes carefully discharging each 5 yd. batch down 2300' of 6" pipe. The 1100' fall of the pipe carried the 5" slump material by gravity. The pipe was flushed with water after each use.



Three mixers made the 235 yd. pour. "Handled the long haul and difficult pour in fine shape, with very satisfactory con-

crete", states Guy M. Elder Jr., of Guy Elder Construction Co., Denver contractors.





**POURING HIGH, DRY AND MIGHTY FAST:** The same Jaeger mixers that could dribble concrete down a 6" pipe at the rate of 8 minutes per yard, made quick work of discharging 2" slump concrete that was so stiff it had to be

vibrated from the bucket. Job is pressure conduit under relocated U. S. Highway 85-87, near new U. S. Air Force Academy at Colorado Springs. Mountain States Construction Co., contractors.

## You can do more with a 3-speed Jaeger

Like every other exclusive Jaeger operating feature, 3-speed transmission makes truck mixers more adaptable to job conditions and faster moving on the payload trip.

Within efficient engine speed range of 800 to 2000 rpm, you can fast-charge with drum at 16 rpm, shift down slow as 1½ rpm for long haul agitation, or adjust engine and drum speeds to discharge the stiffest concrete under any condition the job may call for. Enlarged diameter loader throat and 25% larger discharge blades also help to out-charge and out-discharge other mixers—often by actual minutes on low slump mixes.

Today's Jaeger mixers are also notable for their short center of gravity—for example, Jaeger 5½ yd. with rated

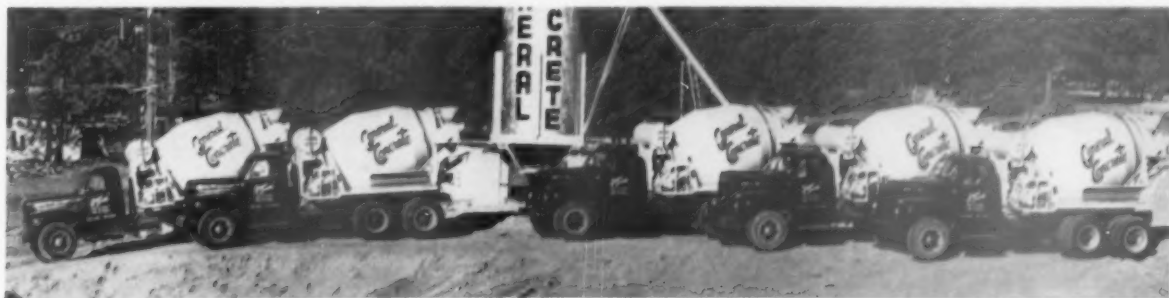
load has 69" c/g versus up to 77" in other makes. And you have your choice of transmission, loader, water system and other equipment to fit your needs, with either separate engine or cab-controlled truck engine drive. For complete details, ask your Jaeger distributor—or write us.

### THE JAEGER MACHINE COMPANY

603 Dublin Avenue, Columbus 16, Ohio



COMPRESSORS • PUMPS • MIXERS • PAVING SPREADERS, FINISHERS



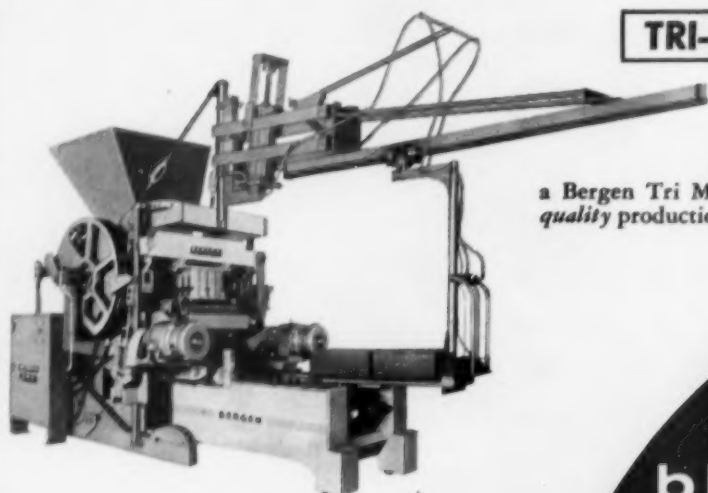
**FASTER THAN RABBITS:** General Concrete put their first 5 new Jaegers in service in February. Now they have 10.

Enter 1173 on Reader Card

CONCRETE PRODUCTS, August, 1956  
A Section of ROCK PRODUCTS

249

and difficult pour in shape, with very satisfactory



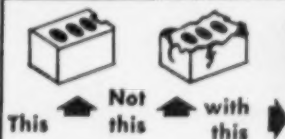
## TRI-MATIC BLOCK MACHINE

a truly HIGH PRODUCTION machine!  
Rugged, Powerful, Dependable . . .  
a Bergen Tri Matic is your assurance of maximum top  
quality production, for many years.



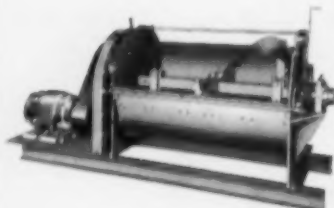
## LIGHT-WEIGHT HOIST

The low-headroom feature (requires only 12 ft.) plus the new powerful magnetic plate makes the BERGEN Hoist a real high-production asset to any block plant.



## Zeromatic HEIGHT & DENSITY CONTROL

The BERGEN ZERO-MATIC automatically controls aggregate volume to the mold and the vibration period under pressure. It maintains precise *Quality Control* on the Density, Texture, and Height of the blocks produced on your block machine.



## BATCH MIXER

Unusually heavy construction — you get longer, trouble-free life from genuine Ni-Hard liners and blades, as well as

double life from the exclusive reversible 130-tooth main gear. All combine to assure superior mixing for many years.

**MORE**  
block plants  
are buying  
**MORE**  
**BERGEN**  
EQUIPMENT

*Every day!*

Phone "Collect" or  
write for complete details and  
prices of these or any other Bergen products.



**BERGEN**

MACHINE & TOOL CO., INC.

**NUTLEY, NEW JERSEY**

Cable Address: "BERGENCO" (Nutley, N. J.)

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# "WE GET COMPLETE CONTROL OF DELIVERIES—WITH RADIO"

Says JOHN F. STEEL, Vice President, Hilltop Building Materials, Inc., Cincinnati, Ohio



## Why are the leaders choosing RCA 2-Way Radio?

They are impressed by RCA's fine nation-wide factory service organization and the years of RCA leadership in radio and electronics. Look for these marks of quality: Superior crystals, tubes and microphones for plainer talking, longer operation... heavy gauge steel case for rugged service... color-coded wiring for simplest maintenance... expert service by RCA Service Company to assure peak performance.

"With RCA Radio we can speed them up or slow them down to suit the contractor's requirements. This results in substantial savings to him in idle time or overtime. We wouldn't want to operate without radio now. It has become an integral part of our operation and service."

Other benefits he notes as follows:

- Contractors are in direct communication with our ten plants, supervisors and engineers. Guesswork is eliminated and everybody

is operating more efficiently.

- Service on truck breakdowns has been so speeded by radio that contractors are seldom delayed. If a plant has a temporary bottleneck or is overloaded with work, trucks may be shuttled between yards with maximum efficiency.

- Completely engineered RCA installation provides excellent coverage despite Cincinnati's famous hills. More than 100 vehicles in fleet are RCA radio-equipped.



## 2-WAY RADIO

TO DRIVER



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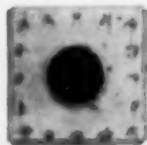
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CONCRETE PRODUCTS, August, 1956  
A Section of ROCK PRODUCTS

251

# Prestressed Hollow-Core 'Incor' Piles

*Speed Wharf Construction at Esso  
Standard Deep Water Oil Terminal*



● Interesting feature of this wharf, recently completed at Esso Standard Oil Company's Deep Water Oil Terminal, Newport News, Va., is the use of precast prestressed hollow-core concrete piles in the tanker dock with its six reinforced concrete mooring and breasting dolphins.

Piles average 77 ft. in length, with 18 x 18 in. cross section and 8 in. hollow core. A total of 151 prestressed piles were precast and pretensioned at job site, three piles at a time in each of seven 250 x 30 ft. pretensioning benches, using 'Incor'® 24-Hour Cement in the mix for faster re-use of the casting beds.

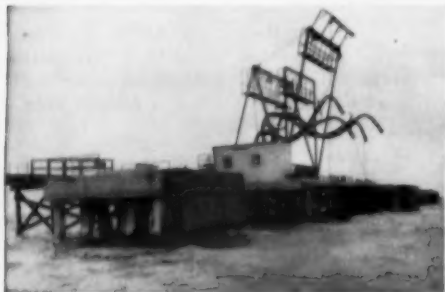
In the pretensioning bench, 'Incor' substantially reduces production time, and therefore cost, by providing



dependable high early strength in 24-48 hours, making possible faster turnover.

In service, 'Incor' high-early and high-ultimate strengths assure quality concrete which is specially important in realizing the fullest advantage from prestressing.

®Reg. U. S. Pat. Off.



Above, left, new wharf is supported on 151 prestressed 'Incor' concrete piles, average length 77 ft. Piles were prestressed at job site; right, placing 'Incor' concrete in forms.

ESSO STANDARD OIL COMPANY—  
DEEP WATER OIL TERMINAL  
Newport News, Va.

Designed by  
CARIBBEAN CONSTRUCTION CO., LTD.  
Kingston, Jamaica, B.W.I.

Engineers and General Contractor:  
TIDEWATER CONSTRUCTION CORPORATION  
Norfolk, Va.

Ready-mix 'Incor' Concrete:  
BENSON PHILLIPS COMPANY, INC.  
Newport News, Va.



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LONE STAR CEMENT, WITH ITS SUBSIDIARIES, IS ONE OF THE WORLD'S LARGEST CEMENT PRODUCERS: 18 MODERN MILLS, 38,000,000 BARRELS ANNUAL CAPACITY





**William Frickey, dispatcher**, above, sets scales on cement while filling aggregate hopper with stone. Batches prepared and loaded into mixer trucks in 1 1/2 min.

**Roy Evens, plant manager**, left, loads a batch for waiting mixer truck.

## Cronin Transit Mix Grows With Detroit

### AUTOMATIC BATCHING

... by electronic controls has cut down waiting time of mixer trucks. The 80-cu. yd. per hour plant is portable

By **GEORGE C. LINDSAY**

**T**HE AGE OF AUTOMATION in ready-mixed concrete plants is here. Progress in the application of modern industrial methods has been rapid in the ready-mix industry. In fact, few industries have experienced the fast rate of rise through mechanization to electronically controlled push-button operation that the ready-mix industry has recorded.

At least as phenomenal is the fact that ability of producers to improve quality of concrete mixes has increased with the application of automatic methods of batching. A good example is Cronin Transit-Mix of Detroit, Mich., which was organized in 1955 with a determined effort to make top quality products with a push-button controlled batching installation.

Availability of lake shipping facilities and strategic location in the middle of a \$100-million Detroit building-expansion project have been combined with production of quality products to spell success for the new company.

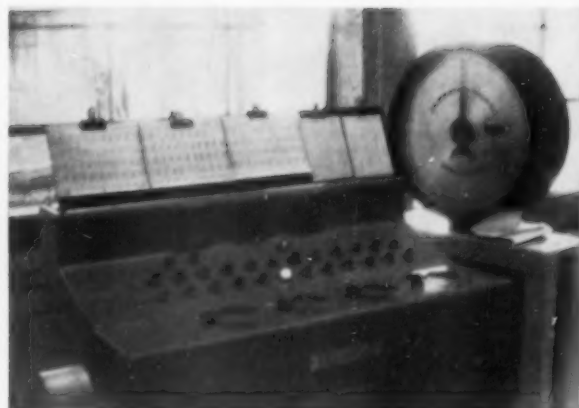
Cronin's new plant is modern in design and installation, and is portable. It can be dis-assembled, moved to a new location and re-assembled for service in three days. It contains a modern pushbutton electronically-operated console that controls the weighing and loading of concrete ingredients to exact specification of the purchaser. The plant is a 6-cu. yd. plant with an output rating of 80 cu. yd. per hour.

### Progressive Management

One reason for the apparent success of Cronin Transit-Mix is the experience and progressive attitude of management. The new company is a division of Pine Ridge Coal Company, which owns and operates a vessel fuel dock on the Detroit River from which Great Lakes freighters are supplied with coal. An affiliate, Cronin Coal and Supply Co., operates dock facilities for handling limestone, dolomite and expanded slag.

Cronin interests are diversified, but all are built around the company's lake-shipment facilities. The parent company dates back to 1912. It was not until 1949, however, that Cronin Coal and Supply entered the aggregate business. At that time, arrangements were made to handle via its lake-shipping facilities slag and dolomite, which were distributed from its Detroit docks. In 1954, expanded slag was added to the other aggregates handled by the company.

From the beginning, company management insisted on good service and high quality in all products it distributed. In doing so, it kept constantly abreast of modern developments in plant equipment, production and marketing methods. Also, it maintained a keen interest in possible future developments that could involve or complement its main activities. The decision of the City of Detroit to begin a \$100-million "Detroit Tomorrow" rebuilding and expansion program on the



Push-button console where one man controls batching operations



Cement scales with electric eye installation on top. Water meter is below scales

river front was recognized by Cronin interests as a project in which their experience and facilities could be used to advantage.

#### A Natural Market

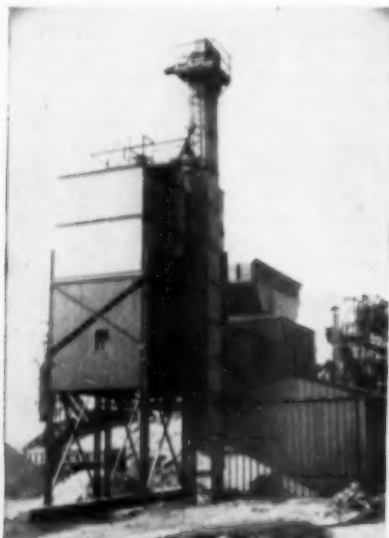
Plans for the "Detroit Tomorrow" program included first the clearing of an old built-up area along the Detroit River. The cleared area will make way for modern concrete and steel structures such as office buildings, auditoriums, memorials and badly needed parking areas. Cronin already handled concrete aggregates via its own lake-shipping facilities. Since Pine Ridge Coal Company owned a dock located close to the city area to be rebuilt, a ready-mix plant seemed to be the next logical step in the company's expansion program. It would be close to a future concrete market, and would provide a comparatively low-cost service to the community.

Decision to install the new plant was

accompanied by Cronin's desire to erect the most modern facility available at the time. Methods and equipment were studied for their ability to provide mixes of the highest quality. Built-in flexibility to supply mixed concrete that would meet any specifications of contractors was considered a "must". In that connection, Cronin believed it desirable to prepare and distribute concrete batches on the basis of strength requirements. It leaned toward the use of the water-cement ratio law in determining proportions of ingredients. It also was believed desirable to install a plant that could be moved close to a large contract job, if conditions warranted. The portable, electronically controlled batching plant now located on East Atwater Street, adjacent to the Detroit River, is the result of that planning. It was designed and constructed by L. Burmeister Co. The electronics were designed and installed by Cyril J. Burke, Inc.

Various sizes of limestone and dolomite aggregates that meet Michigan specifications are unloaded at the plant site by self-unloading boats. Sand, also washed and graded to state specifications, is hauled to the plant site from sand pits in the area by tractor-trailer. Two 1-cu. yd. clamshell cranes move aggregates from storage piles into a three-compartment 225-ton bin at the top of the plant. Each of two 75-ton compartments contains a different size of stone (Michigan 10-A, 6-A), and the third contains sand.

Type 1 portland cement is received in bulk via railroad car. It is unloaded by a standard car unloader through unloading hoppers to screw conveyor and elevating conveyor to trucks. It is hauled a short distance to the plant and delivered to two 600-bbl. bins through a loading device similar to the railroad-car unloader. The plant is designed so that two types of cement may be used. The present operation



Steps in loading mixer trucks: left, truck at first loading position under aggregate hopper; center, cement loaded here (trucks haul bulk cement to a hopper at the base of the bucket elevator that fills two cement bins); right, truck at second loading position under cement hopper

uses only one type, which is loaded into both cement bins.

**Batching Aggregates.** The plant has two loading stations. The first is where aggregates, water, air-entraining agent, and waterproofing compounds are loaded; cement is added at the second station. When a mixing truck is in position to receive a load at the first station, handles on the push-button console are used to operate air valves that control aggregate-bin gates. Stone is loaded into the batcher first. Amount is loaded according to quantity required in the specified order, the amount being indicated on a 30,000-lb. Fairbanks batcher-type scale installed at the right of the push-button console. Sand is then loaded into the batcher and weighed to the cumulative weight desired for the type and quantity of mix. The sand bin gate also is opened and closed by an air-operated valve handle on the console.

Amount of water to be added to the mix is determined from charts that give quantities required for specific types of mixes. Water quantity is adjusted in accordance with aggregate moisture content, which is checked by Gammon-Morgan Estimator three or four times daily. Gallons of water required for the mix then are set on a Buffalo water meter. Operation of a push button on the panel starts the flow of water into the batching hopper. The button operates a solenoid that opens a McAleer valve in the water line. A switch in the meter operates another solenoid in the valve to close it when the desired quantity of water has been added.

In winter, water is preheated by a 60-hp. Gross automatic oil-fired steam generator. Steam from the generator is circulated through coils in the adjacent water tank to bring temperature of the water to 185 deg. F. That is sufficient to maintain a temperature of 60-80 deg. F. in the concrete mix. The steam generator also supplies steam through jets to the batching hop-



**Overall view of plant.** Building in foreground houses office, steam generator, hot water heater, compressor and additive tanks. Aggregate bins in right background with cement bins to the left

per to heat material and to break lumps that may form in the mix.

**Additives.** Facilities are available for adding Darex air-entraining agent, Pozzolith waterproofing compound and calcium chloride, if required. Each is dispensed as a liquid formed by combining specific amounts of the chemicals with water in a separate supply tank. Dispensing is accomplished through gauges and automatic control on the push-button console. The Darex gauge is a timer that is calibrated to pass three ounces of the material per second, or sufficient to supply  $\frac{3}{4}$  ounce per sack of cement. Darex is added to the sand portion of the mix.

Pozzolith is an admixture used as a waterproofing agent. One-quarter pound of chemical or one quart of liquid is added per sack of cement used in the mix. The Pozzolith gauge is calibrated in pounds of cement load. The material is added to the aggregate mix with the heated water.

Calcium chloride is mixed in the supply tank in the ratio of 1,000 lb. per 250 gal. of water. This chemical is added at the rate of one pound per sack of cement for a 1-percent mix, two pounds per sack for a 2-percent mix, etc. The calcium chloride gauge is calibrated like the Pozzolith gauge. This chemical also is added to the mix with heated water.

When desired, additive gauges are set properly for the type and size of mix, and the chemicals are added with the aggregates and water through a push button on the console. Solenoid connection between the button, gauges, valves, pumps and tank floats make the entire operation automatic.

After aggregates, additives and water have entered the batching hopper, an air-valve handle on the console that controls the bottom hopper open-

ing is operated to discharge the mix to the truck. The truck then moves to the second, or cement, loading station.

**Cement.** While aggregates and water are being added to the aggregate hopper, the plant operator has set the posie weight on the Buffalo cement scale for the proper amount of cement desired for the mix. The cement scale is located to the left of the console. Pressing the "start conveyor" button (one for each cement bin) on the console starts the cement batching screw conveyor under the cement bin. When the amount of cement in the weigh hopper is sufficient to cause the scale level arm to balance, the cement screw conveyor is stopped electronically. That operation is controlled by a paddle dash-pot indicator that is connected to the scale lever arm. When the lever arm is balanced, the paddle indicator moves to block an electric-eye beam which, in turn, operates a solenoid that stops the screw conveyor motor. Electrical interlock then prevents addition of more cement to the hopper until it has been emptied.

Push buttons on the console control



**Arthur D. Cronin, Jr.**, president of the Pine Ridge Coal Co., controlling company



**Roy Evans**, plant manager

the opening and closing of the cement hopper gates, and the vibrators. The latter are used to assure complete removal of cement from the hoppers. Lights on the console indicate when the cement hoppers and bins are full or empty. Bindicators are used at full and empty levels, and they are connected electrically with proper indicator lights on the control panel. The top-level indicators on the cement bins cause an alarm to ring, so that there is protection against overloading of the bins.

The electronically controlled plant can complete a mix and unload it into a waiting truck in 1½ minutes. The plant has an output rating of 110 tons or 80 yards per hour. One advantage of the push-button console is that all operations are completely interlocked electrically so that no operation may be completed unless the prior operation has been effected. One man can operate the whole plant. Also, operation of all plant motors is controlled from inside the plant office. When that office is locked, no plant machinery can be operated.

#### Cost Consciousness

Plant management is deeply interested in sufficient record keeping to determine plant costs as accurately as possible. It believes that such procedure is important to customers as well as to the company. Company officials state that an attempt is made to decrease costs as much as possible as volume of business grows. Cost reduction is shared with consumers through lower prices.

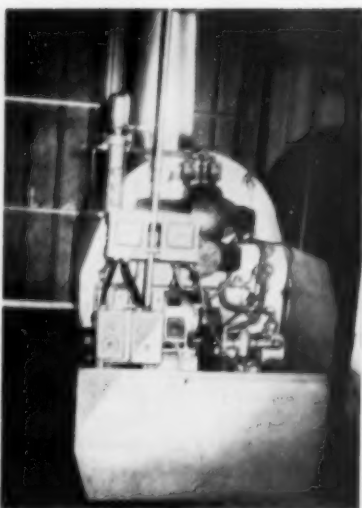
Plant costs are recorded as three separate categories. They are calculated daily and are cumulated monthly. The categories are:

1. Direct costs. Include cost of aggregates, cement and admixtures.

2. Delivery costs. These costs are kept in such a manner that unit cost per truck hour, unit cost per yard, per truck per hour, or per yard per hour may be determined.

3. Overhead costs. Include fixed plant costs.

Material used each day is recorded by type of material. A perpetual inventory of cement is kept. Amount



Steam generator supplies steam for heating water and also for the jets to break up lumps in aggregate hopper

used is calculated in terms of barrels from markings on the cement bins. Calculated data are checked with actual weights recorded on sales slips each day. Results are entered on the cement inventory to provide actual supply data each operating day. Scales are checked weekly by the company, and monthly by the state.

Officials of Pine Ridge Coal Company include A. D. Cronin, Jr., president; H. J. Northmore, vice president; and James B. McLaine, secretary-treasurer. Cronin Transit-Mix officials include Robert R. Evans as plant manager and William Frickey as dispatcher.

Cronin Coal and Supply Company officials are John Sweeney, president; A. D. Cronin, Jr., vice president; Walter J. Cronin, secretary-treasurer; and R. B. Cronin, a director.

A fleet of G.M.C. trucks, on which 7-cu. yd. Jaeger mixers are mounted, handles the delivery of concrete.

#### Vacuum Concrete Tests

BLAKE MACKAY ENGINEERING CO., of East Africa, is conducting experiments using local pumice aggregate for concrete manufacture under a patented vacuum process. The process,

which hastens curing, is being used with Bamburi cement by Braithwaite & Co. on the construction of the deep water berths at Mombasa, East Africa. The franchise for the process is held by Millars Machinery Co. Ltd., who are represented in East Africa by the Blake Mackay Engineering Co.

#### Trends in Prestressing

PRESTRESSED CONCRETE PRICES are so low that concrete as a roof deck is now competitive with many conventional designs. Easy load calculation and adjusting of camber have been helpful in widening the application of prestressed concrete. H. H. Edwards, president, Leap Concrete Inc., pointed out these and other facts at the Concrete Conference, Case School of Applied Science.

Standardization of products is gradually coming about—30 United States firms produce concrete T-beams from the same size form—and this means higher output per man hour. Form amortization is reaching a low figure since the presently used long-line, all-steel forms can produce a million dollars worth of product.

Larger size wire results in savings since it costs less per pound of pull, costs less to handle, provides greater concentration of prestressing force and permits larger aggregate sizes. Lightweight aggregate is being used more often as a result of better design techniques that produce low concrete stress reducing problems inherent with lightweight mixes.

With the industry shift to T-section roof members, calculations have been simplified since using strength of steel at approximately 2 percent permanent set times the moment arm gives a conservative and easy calculation of the ultimate load. The moment is balanced against downward bending moments to make top and bottom fibre stresses equal. Then the dead load is the prestressing force divided by the cross-sectional force of the member.

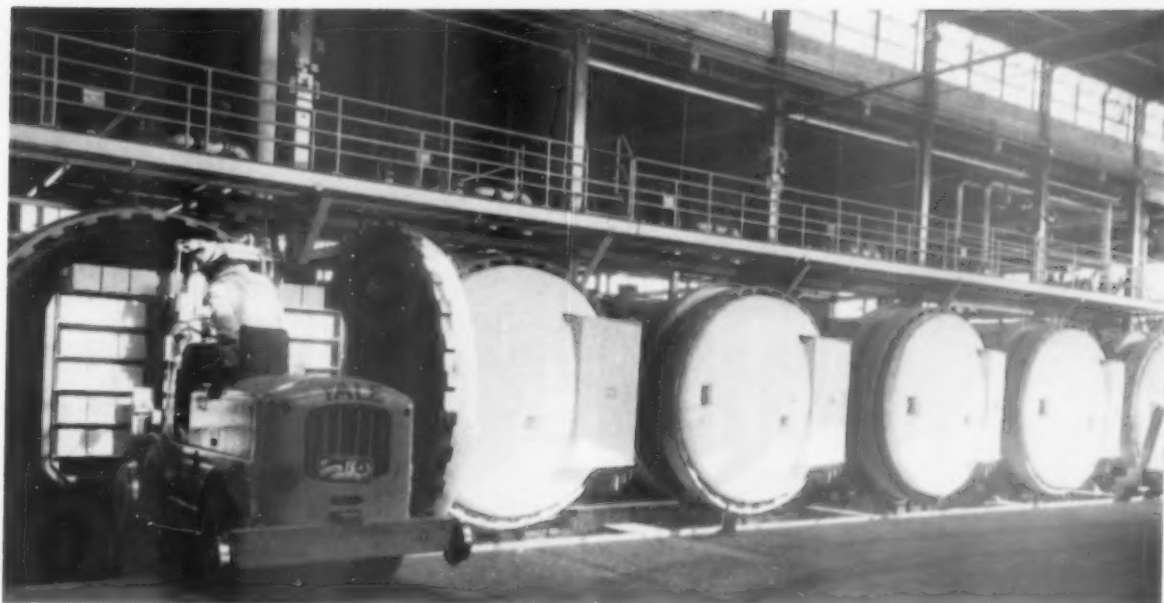
The use of sloping strands has permitted the center of gravity of steel at end spans to be quite high, thus reducing end span concrete stresses. This sloping strand procedure has also afforded a greater concentration of prestressing force with a higher eccentricity at mid-span; therefore the use of sloping strands has assisted materially in increasing the efficiency of the overall design.

Mr. Edwards summarized, "We see today a new industry ready for large expansion. The ground work over the past three years has laid the foundation for a gigantic manufacturing industry for the production of pre-tensioned concrete roof slabs."

#### MAJOR EQUIPMENT REFERENCE

Clamshell cranes, 1-cu.-yd.	Bay City Shovels, Inc.
Plant design and construction	American Hoist & Derrick Co.
Design and installation of electronics eqpt.	L. Burmeister Company
Console control panel	Cyril L. Burke, Inc.
Aggregate scales	Gemco Electric Co.
Cement scales	Fairbanks, Morse & Co.
Paddle dash-pot indicator	Buffalo Scale Co., Inc.
Cement scale electric eye	Spinks Scale Co.
Water meter	Fisher-Pierce
Possolth gauge	Buffalo Meter Co.
Dares and calcium chloride gauges	The Master Builders Co.
Possolth	Industrial Timer Corp.
Dares	The Master Builders Co.
Calcium chloride	Dewey and Almy Chemical Co.
Portable steam generator	Dow Chemical Co.
Hot water heater	Wm. Bros Boiler & Mfg. Co.
Air compressor	The Patterson-Kelley Co., Inc.
	Quincy Compressors





Showing line-up of six autoclaves with a lift truck moving rack of block into one of the autoclaves

## Speed Up Curing With High-Capacity Autoclaves

### READY MARKET

... for high-pressure, steam-cured lightweight concrete block induced Cinder Block, Inc., Detroit, Mich., to spend \$650,000 for six autoclaves

By HUBERT C. PERSONS

SIX AUTOCLAVES and six preheating kilns provide ultra-modern curing facilities with adequate room for expansion in the plant of Cinder Block, Inc., Detroit, Mich. This is one of the largest autoclave installations made in any single plant. It affords curing capacity which could accommodate 32,400 8-in. block every 24 hr. The autoclaves and related plant facilities represent an investment of approximately \$650,000. Several years of market study of lightweight aggregate block and visits to plants curing with high pressure steam, preceded the decision to make this large investment.

"We wanted to make a block as economically as possible but turn out a strong and durable product with low shrinkage," Walter W. Horn, Cinder Block's president said, describing the company's studies and surveys. "We

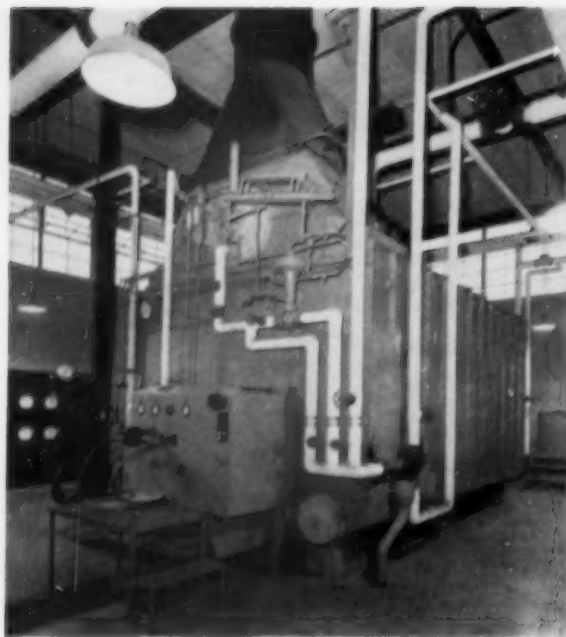
felt that there was no question about a ready market for high pressure steam cured lightweight block, and our advertising agency, Langsdale Advertising, Inc., experienced in the cinder concrete products field, agreed with us," said Mr. Horn.

The six autoclaves, each 82-ft. 6-in. long and 10-ft. outside diameter, were made by Richmond Engineering Co., Richmond, Va. The capacity of each is twenty-five 108-block (8- x 8- x 16-in. equivalents) racks. The quick-opening doors were furnished by Anchor Pressure Doors, Inc. Six preheating kilns, each 87-ft. long, 14-ft. wide and 10-ft. high, are built in tandem with the autoclaves to facilitate movement of pre-heated block to autoclaves.

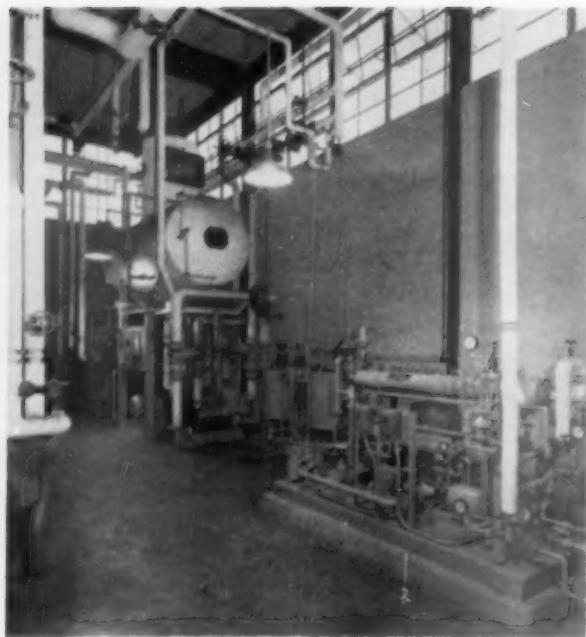
The floor space occupied by the autoclaves and preheating kilns is 140-

x 296-ft. Because of the autoclaves' large dimensions, these facilities were installed first and then a steel frame building was erected around them. Concrete masonry panels between columns were laid up in stacked bond. The roof was built of concrete masonry filler block on concrete joists. A 2-in. concrete slab was placed over the entire roof assembly. The building has three heights; the portion over the autoclaves is 23 ft. high; in front of the autoclaves there is a clear story area 30 ft. high; the area between the monitor section and the block plant is 17 ft. in height. The upper section of the building is enclosed with ventilating steel sash windows.

It was necessary to build a separate boiler house and steam generating plant on the opposite side of the switch



High-pressure boiler installation



Interior of boiler plant showing feedwater heater

tracks, because depth of the building was limited by a 40-ft. wide railroad right-of-way for a switch track through the plant. Steam and water lines are carried from the boiler house to the curing room on a trestle elevated 24 ft. above the tracks. The boiler house is 49- x 44-ft. with a clear inside height of 23 ft. Walls are concrete masonry laid in stacked bond. Exterior walls are finished with one coat of white cement paint and a finish coat of masonry paint. Interior walls are finished with a flat oil paint in gray on two walls and cement enamel on the other two. The roof is similar to the roof of the larger building.

The 359-hp. Union Iron Works water tube boiler has a heating surface

of 3599 sq. ft. with a capacity of 30,000-lb. of steam at 150 p.s.i. Fuel is Bunker C No. 6 fuel oil costing 9¢ per gal. Fuel consumption is an average of 2,000 g.p.d.

**Water requirements** average 30,000 to 35,000 g.p.d. from the city mains. Water is treated with two Zeolite water softeners. A meter board with a Bailey recording meter for each autoclave is installed in the boiler room.

The block are described in company literature as "Horn-Claved, high-pressure steam-cured lightweight concrete masonry units containing less than 30 percent moisture." The block are made on two Besser Vibrapac machines. These machines have an annual ca-

capacity in excess of six million 8 x 8 x 16-in. equivalents. Each block machine is served by a 50-cu. ft. Besser mixer. A Butler traveling batcher weighs the cement and aggregate. Water is metered at the mixer. Two electrically operated turntables in front of the block machines facilitate the handling of block racks. The turntables are controlled from the mast of the offbearer hoist.

**Three types of lightweight aggregate are used.** These are high pressure boiler cinders from Detroit Edison Co., expanded slag from Lorain Slag Co., Lorain, Ohio; and Lite-Stone, an expanded shale made by Sunny Hill Aggregates Co., New Lexington, Ohio. The cinders are trucked from the Delray plant of Detroit Edison. The expanded slag, delivered by water to a dock on the Rouge river, is hauled to the plant in 13-cu. yd. trucks. It is crushed and graded at the source. The shale aggregate comes by rail as a graded product.

Normal cement is used from two suppliers, Huron Portland Cement Co. and Peerless Cement Corp. The cement is delivered in bulk trucks. It is unloaded into a Butler bucket conveyor which takes it to a 600-bbl. storage bin above the mixing platform. Fly ash, used as an additive, comes from a Detroit Edison plant and is stored in a 300-bbl. bin.

The cinder aggregate is first put through a 24-in. x 20-in. Jeffrey hammermill which reduces it to 2½-in.

(Continued on page 261)



Robert Horn, center, of Cinder Block, Inc., talking to Bill and Ed. Chase on a tour of plant by members of the Autoclave Building Products Association



## ADJUSTA-WATE MOTO-MIXERS



### LEADERSHIP Looks to Tomorrow ... Today

The ability to look ahead, work ahead, to the needs of tomorrow, is a characteristic of leadership!

This is the great advantage Rex Adjusta-Wate Moto-Mixers offer you. Rex leadership brings you the "years-ahead" features today ... gives you those profit-making advantages that keep you ahead of your competition. With Rex, you lead with *your* customers! In many cases, it will be years before you can expect comparable advantages in ordinary truck mixers.

Major improvements cannot be accomplished overnight. Sometimes they take years of experimentation and testing before they are truly ready! Actually, Rex engineers are today working on developments that look far into the future. When they will be ready is difficult to say. For, as the leader, we cannot afford to gamble ... to let users bear the burden of testing. The progress of ready-mix concrete ... of truck mixer development ... is too closely allied with Rex leadership for us to take

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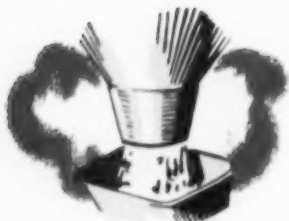
unnecessary chances. BUT, this we can promise — if you want to keep ahead of your competition ... if you want to give your customers the best in service and quality, you'll want Rex

Adjusta-Wate Moto-Mixers. They're as far ahead of the field today as was the first truck mixer we introduced more than 25 years ago. You're always ahead with Rex.

## YOU'RE DOLLARS AHEAD... EVERY DAY WITH **REX** ADJUSTA-WATE

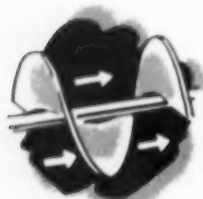
The "years-ahead" design of Rex Adjusta-Wate Moto-Mixers® is built around a simple fact — the *faster* you can charge your mixer, mix the concrete, deliver it and return for another batch ... the more profit you make. Actual "time tests," under every conceivable type of operating condition, prove that

Rex is minutes faster on the complete cycle. Add up the number of trips you make per day and you'll easily see how important these minutes saved per trip are. They mean more trips per truck ... extra deliveries ... more customer satisfaction. And, satisfying customers is your best path to profit.



### CHARGING

We do not claim Rex will charge faster than any other mixer. But, don't be fooled by claims of charging speed. A few seconds saved at the plant is only achieved by the sacrifice of speed in mixing and discharging, where slowness will cost you minutes. We *do* state that no other truck mixer will equal the over-all speed of a Rex. Rex gives you speed where it counts ... the fastest trip cycle.



### MIXING

No truck mixer will even approach the speed or thoroughness of the Rex mixing action. Speed here is important ... and quality of mixing is even more important. Your customers demand thoroughly mixed, uniform, top-quality concrete and you give it to them with Rex. The Adjusta-Wate design principle that provides a drum of proper size, shape and low incline also provides the greatest free mixing space — a "must" for quality mixing!



### DISCHARGING

Here is where you ... and your customer ... appreciate speed. Rex will discharge faster ... more completely ... and with a spouting range greater than any other mixer. The Adjusta-Wate design principle *always* locates the discharge point back of the rear tires where it must be for effective discharge. Only the Adjusta-Wate principle permits mounting the mixer on any truck to gain this favorable discharge ... and still retains proper load distribution for maximum pay load.



ONLY THE LEADER

**ADJUSTA-WATE MOTO-MIXERS**

LEADERSHIP... THROUGH CREATIVE ENGINEERING

**CHAIN BELT COMPANY**

Rex® Adjusta-Wate gives you the important three that add up to fastest operation ... more trips per day.®

4695 W. Greenfield Ave., Milwaukee 1, Wis.

Litho in U.S.A.



size. It is then passed to a specially designed 24- x 36-in. roll crusher which reduces the material to minus 1/2-in. This roll crusher has a capacity of 1-cu. yd. per min. The cinders are passed from the crushers over a series of Simplicity vibrating screens which separate material larger than 3/8-in. and return it to the crushers. From the screens the cinders are carried by a Barber-Greene belt conveyor to one of four 75-cu. yd. storage bins.

Both the cinders and the expanded slag are passed over a series of magnetic separators to insure the removal of tramp iron.

Three Yale & Towne 8000-lb. lift trucks are used to carry the block from the Besser machines to the preheating kilns where they are steamed at atmospheric pressure for 2 hr. in a temperature range of 125 to 140 deg. F. While still warm, the block are taken from the preheating kilns to the auto-claves, 25 racks at a time.

The high-pressure curing cycle consists of 3 hr. build-up time and 5 hr. at working pressure of 140 p.s.i. which is 360 to 365 deg. F. Once the auto-claves are above atmospheric pressure, cycling is controlled automatically by Bailey valves in the boiler room.

Blow-down, through two Maxim silencers, at the end of the high pressure period, requires 30 min. The plant operates on two shifts a day with two curing cycles two hours apart.

Cinder Block, Inc. is a successor to the Detroit Cinder Block & Tile Co. which was organized in 1923. The present corporate name was adopted in 1934.

Key executives of the company are: Walter W. Horn, president; Robert H. Horn, vice-president and secretary-treasurer; sales manager, Herbert J. Vincent; and production manager, Arthur V. Leece. The latter two started with the original company in 1923. The block plant and the Horn Fuel & Supply Co., jointly occupy a 20-acre tract of land at 9143 Hubbell Ave., Detroit.

### Corrosion-Proof Coating

THE CHELCOTE CO., INC., Cleveland, Ohio, has brought out Corocrete "A", a corrosion proof float coating which is said to resist alkalis, solvents and acids. Design for application directly over concrete, it is composed of three basic ingredients, a thermo-setting resin liquid, a hardening agent, and an aggregate-type filler. It handles like cement topping and is applied in thicknesses from 1/4-in. minimum to 3/4-in. maximum. It is said to cure in a few hours to a dense, impermeable and non-dusting surface.



Left to right: R. H. Merryman, assistant manager-engineer of the Concrete Products Association of Washington; Leland Spahr, the new engineer-manager of the association; and Thos K. Breitfuss, American Concrete Pipe Association

### Washington Pipe and Block Meeting

THE CONCRETE PRODUCTS ASSOCIATION OF WASHINGTON held its annual summer meeting June 22 to 24 at the Empress Hotel, Victoria, B. C. In addition to concrete block and pipe company representatives, Washington portland cement manufacturers as well as machinery and aggregate producers also were present. Cocktail parties were sponsored by the Superior Portland Cement Co., Seattle, and the Colorado Fuel and Iron Corp.

President V. Frese introduced Leland Spahr, the new engineer-manager of the association at the opening business session. Mr. Spahr was formerly with the Washington State Highway Department. Thos. K. Breitfuss, from the Chicago offices of the American Concrete Pipe Association, outlined the expanding activities of the national association. Mr. Breitfuss indicated he would spend more time in the West Coast areas. Raymond W. Kersey, Industrial Commissioner, Department of Trade and Industry for British Columbia, the banquet speaker, told about the growing importance of British Columbia, its industries and manufacturing facilities. A color sound film depicted the industrial might of the Northwest.

Officers elected were: president, James W. Sullivan, Bremerton Concrete Pipe Co.; vice-president, James B. Lundberg, Lundberg Concrete Pipe Co., Tacoma; and secretary-treasurer, Ellis Cummings, Yakima Cement Products Co. New directors are: Chas. B. Walters, Spokane Concrete Pipe Co.; Robert W. Hutton, Bellingham Builders Supply Co.; and John W. James, Graystone of Olympia, Inc. R. H. Merryman is assistant manager-engineer of the association.

### E.C.S.A. Reveals Production

EXPANDED CLAY AND SHALE ASSOCIATION, Allentown, Penn., announced that its members had produced close to 1,500,000 cu. yd. of lightweight aggregate in 1955. The mid-year meeting heard a report on percentage depletion by D. M. Groves and discussed research and product data led by Henry O. Pommer. Sol Marenberg, consulting engineer, gave his views of The Uses of Lightweight Aggregates in Modern Construction.



New officers of association, left to right: James W. Sullivan, Bremerton Concrete Products Co., president; and James B. Lundberg, Lundberg Concrete Pipe Co., Tacoma, vice-president

NATIONAL TERRAZZO AND MOSAIC ASSOCIATION heard an address by Casper Smith who stated that dry colors in terrazzo are most effectively measured on a weight basis rather than volumetrically. Mr. Smith also said that his company, Smith Chemical and Color Co., has noted a definite trend to the use of the brightest colors available.

# 2-WAY RADIO

makes satisfied customers for Travers Supply Co.  
of Decatur, Ill.



*Photos Courtesy Decatur Herald Review*

## **SPEEDS READY-MIX CONCRETE DELIVERY**

*Direct from the site, Ralph Calfee radios dispatcher John Mosser that another yard is needed to complete the job.*

### **HERE'S HOW RADIO HELPS YOU**

John Stoune, Travers' manager, was arriving at a job in his radio equipped station wagon. Dispatcher Jim Mosser radioed, wondering about a gravel truck due on the job. Stoune answered, "He's dumping the load now—should be back in 20 minutes." Dispatcher Mosser knew exactly when he could schedule that truck for another job. A mixer returning to the plant was heard reporting mechanical trouble. A service truck was immediately sent to him and a spare truck dispatched to fill his next order—as much as an hour saved, not to mention the finisher's temper if he had run out of cement.

If forms aren't ready, the dispatcher gets the report in 30 seconds and can direct the mixer to another site nearby. When an estimate runs short, a fast radio call—direct from the job—gets the concrete there to finish the job. Loose ends at the end of the day are cleaned up easier with radio—drivers and batch plant men get home on time, and expensive overtime payroll is slashed.

With constant dispatcher contact and control, every truck does a bigger job every day, making a more efficient, more profitable operation. And customers are kept serviced, happy and loyal.

### **HERE'S WHY MOTOROLA DOES THE JOB BETTER**

Motorola consistently supplies more mobile and portable radio than all others combined . . . proof of acceptance, experience and quality. The only COMPLETE radio communications service—specialized engineering . . . product . . . customer service . . . parts . . . installation . . . maintenance . . . finance . . . lease.

**VERSATILE**—Motorola produces the greatest variety of 2-way radio equipment available—equipment that can be combined to form a custom-made system at production line prices.

**RUGGED**—It is built to take the severe beating that any ready-mix work imposes on it—proven in use for long life, dependability and economy.

**SERVICE**—There is a Motorola Service Station near you. Motorola offers the most complete national service set-up—700 Authorized Service Stations, on call 24 hours a day.

**TERMS**—You can have Motorola 2-way radio on purchase, time payment, or lease (with or without equity).

Get the full facts from a Motorola Communications Engineer. Write, phone or wire TODAY!



## **MOTOROLA**

**COMMUNICATIONS & ELECTRONICS, INC.**

A Subsidiary of Motorola, Inc., 4501 Augusta Boulevard, Chicago 51, Illinois

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# Fluorine Gas Makes Concrete Chemical-Resistant

By J. van der EERDE\*\*

UNTIL RECENTLY, the Ocrating-process has been a treatment in which the material was exposed as an extension of the normal production method. The pre-dried concrete product was brought into a treatment-tunnel, in which silicon-tetrafluoride ( $\text{SiF}_4$ ) was admitted. As a result of the reaction between this gas and various components of the cement-skeleton of the concrete, the chemically instable molecules were transformed into calcium-fluoride and other very strong and corrosion-resistant compounds. At the same time a deposit of silicon dioxide ( $\text{SiO}_2$ ) took place in the pores of the material.

A characteristic chemical equation of this reaction

$2 \text{Ca(OH)}_2 + \text{SiF}_4 \rightarrow 2 \text{CaF}_2 + \text{SiO}_2 + 2 \text{H}_2\text{O}$   
can be mentioned.

The quantity of gas, however, which can be consumed by a certain quantity

\*A Dutch invention (U.S. Patent No. 2657154), reported in *ROCK PRODUCTS*, November, 1955, pg. 166.

\*\*Gen. Mgr., Oerietfabriek N. V., Baarn, Netherlands.



Concrete test specimens in Ocrate treatment tunnel which is equipped with special quick-closing door

Gas reactor to produce  $\text{SiF}_4$  from sodiumsiliconfluoride, Kiesegelgur and sulphuric acid



## OCRATE CONCRETE

... The Ocrate-process\* makes normal concrete chemical-resistant and at the same time stronger and more impermeable to water by treating the material with a fluorine-containing gas. Prolonged experiments, aimed at practical application, have now led to the manufacture of a special kind of concrete that can be made with ordinary machines. The Ocrate-concrete will come into the European market within a short time for the manufacture of concrete pipe and tiles.

of concrete, shows that the reaction is much more complicated and a number of transformations takes place in the material initiated by treatment with the  $\text{SiF}_4$ -gas.

Prolonged experiments have proved, indeed, that not only the free lime  $\text{Ca(OH)}_2$  reacts with the  $\text{SiF}_4$  gas, but that in fact hydrated calcium-silicates and other compounds take part in the reaction, too. Concrete, which contains only a little  $\text{Ca(OH)}_2$  or no free lime at all, can still be influenced favorably by treating the material with siliconfluoride.

Experimental research by the Oerietfabriek N. V. at Baarn (Holland), the discoverer of the Ocrate method, has determined the best way to proceed with the Ocrating could be ob-

tained, starting from existing methods of production. It is now possible to manufacture a special kind of concrete that combines a good chemical resistance with high strength, using certain exactly determined mortar-compositions and grain gradations and by adaptation of Ocrating to the usual curing methods.

**Less labor, larger output:** By combining the gas treatment with drying and curing of the product, Ocrate-concrete can be manufactured in a considerably shorter period than the ordinary kinds of concrete. The treatment-tunnel, in which the reaction of the concrete with the  $\text{SiF}_4$  gas takes place under vacuum, is also used for

(Continued on page 266)

# REO "CHUTES"

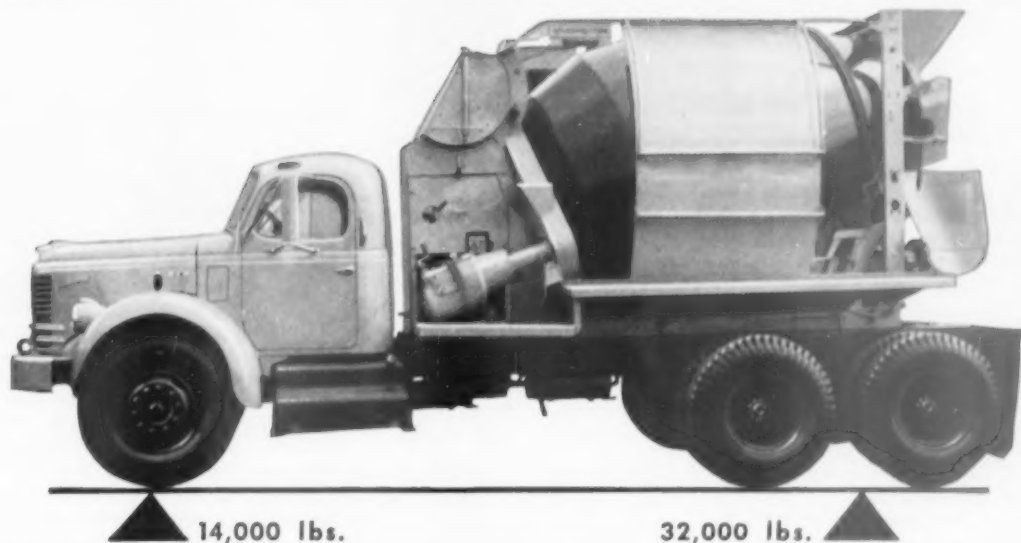


Reo tandems chule concrete directly into tremies while pouring a 2710 cu. yd. seal for bridge pier in Portland, Ore. A Seattle construction and engineering co. completed the pour in 20 hours, averaging 135 cu. yds. an hour.



# MORE MIX

**6 1/2 yds. within 32,000 lb. tandem limit**



If you want to haul more mix at lower cost—LOOK AT REO! The new Reo F-506M is designed and built specifically for mixer use. The F-506M hauls bigger payloads because it has new high-strength, low weight double-side-rail frame construction and "payload-engineered" weight distribution. And because Reo is tough—real tough all the way through.

The new Reo F-506M actually hauls up to 2 yards more than the average mixer chassis. And it places as much as 6,000 pounds more on the front axle than other conventional mixer trucks. Additional hundreds of pounds can be added to the carrying capacity of the new Reo F-506M with Reo's optional front-end power take-offs. The PTO also eliminates extra fuel and maintenance costs of the mixer's auxiliary power unit.

With Reo, you can haul your regular daily volume with fewer trucks and drivers . . . or increase daily volume without increasing your fleet.

Reo full power steering, which is standard, makes maneuvering easy in tight places anywhere.

The new F-506M is powered by Reo's own 160 hp

short-stroke, wet-sleeve Gold Comet engine. Plenty of power for both truck and mixer. And you get Reo's famous 100,000 mile or one year engine warranty.

For states that permit greater axle loadings than 32,000 lbs., Reo builds the F-536M—52,000 lbs. G.V.W. Thirty-three other models, including eight off-highway units, means a Reo truck ideally suited for any construction job.

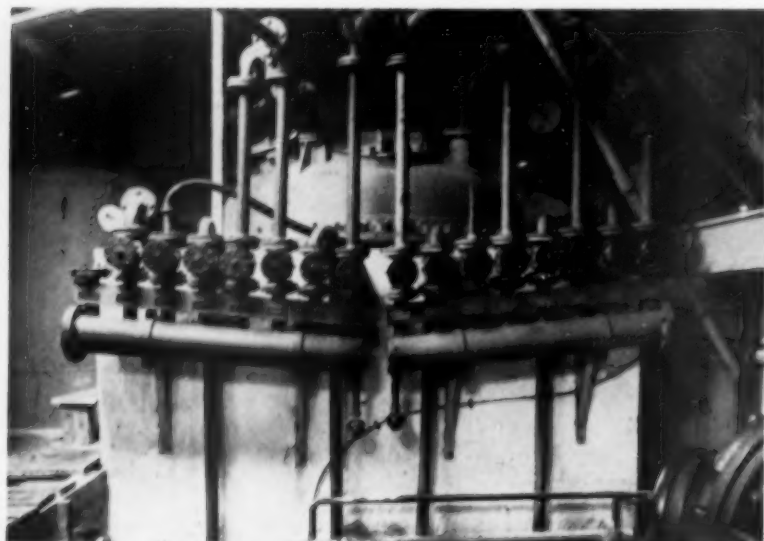
Seeing is believing. Call your Reo branch or distributor today and ask for a demonstration on your job or write for free folder.

**REO MOTORS, INC.**

LANSING 20, MICHIGAN • TORONTO, ONTARIO

SUBSIDIARY OF **BOHN** ALUMINUM AND BRASS CORPORATION

**REO**  
WORLD'S TOUGHEST TRUCK



Gas storage tank (SiF<sub>4</sub>) with pipe lines and valves to serve two Ocrate treatment tunnels

drying and even for partial curing.

Production of Ocrate-concrete, therefore, does not require any more workmen than the manufacture of ordinary concrete products. The market value of the Ocrate-concrete products, however, is considerably higher than the value of other concrete products.

**Properties of Ocrate-concrete:** The previous article in *ROCK PRODUCTS* included a detailed summary of chemical resistance improvement that can be obtained by Ocrating. With respect to sulfates and lactic acid, Ocrate-concrete can be considered completely resistant. Exposure of this treated concrete to such hydrochloric acid shows a multiple resistance.

The extreme strength of Ocrate-concrete is revealed in the test-results of concrete tiles made by the Dutch certified laboratory of Koning & Bienfait in Amsterdam. These tiles, measuring 30 x 30 x 4.7 cm., have been manufactured, using vibrated concrete made with ordinary portland cement (Encielite B) and aggregate. For each cubic meter of concrete, 235 kg. of cement have been used. The quantity of gas, reacting with the material, has been determined to be 100 liters SiF<sub>4</sub> for each liter of concrete.

According to Dutch standards, the tiles have been tested after 24 hr. drying at 60 deg. C., with 20 cm. distance between the two points of support. At the moment of testing, the tiles were only nine days old.

These startling figures are still more

Test	Breaking point was reached with:	Tensile flexural strength:
1	2742 kg.	m124.1 kg/cm <sup>2</sup>
2	3026 kg.	137.0 kg/cm <sup>2</sup>
3	2993 kg.	135.5 kg/cm <sup>2</sup>
4	3093 kg.	140.0 kg/cm <sup>2</sup>
Average	2964 kg.	134.2 kg/cm <sup>2</sup>

important when compared with the breaking point of the best quality Dutch ordinary concrete tiles, that have a value of 1300 kg. (4.5 cm. thickness) and 1650 kg. (5.0 cm. thickness) after 28 days, according to official standards.

The compression strength of the Ocrate-concrete tiles has been tested as well:

Test	Breaking point was reached with:	Compression strength:
1	26,900 kg.	1121 kg/cm <sup>2</sup>
2	25,500 kg.	1085 kg/cm <sup>2</sup>
Average	—	1103 kg/cm <sup>2</sup>

Comparing these figures with the ordinary Dutch Ocrate tile, it can be observed that the standard requires a compression strength of 600 kg/cm<sup>2</sup> (4.5 cm. thickness) or 595 kg/cm<sup>2</sup> (5.0 cm. thickness.)

To determine the abrasion strength, wet test-specimens of 7 x 7 x 5 cm. have been tested with the Amsler-machine, with a load of 0.3 kg/cm<sup>2</sup> over 500 meters. These tests showed the following results:

Test	Loss of volume:	Loss of thickness:
1	6.433 cm <sup>3</sup>	0.125 cm.
2	5.398 cm <sup>3</sup>	0.105 cm.
3	5.605 cm <sup>3</sup>	0.110 cm.

The Dutch standardization requires a maximum loss of thickness of 0.25 cm. for ordinary concrete tiles of the best standardized quality.

The nearly unlimited possibilities of this new kind of concrete are obvious. In Europe there is great interest in Ocrate concrete pipe for sewerage. A serious corrosion problem in the use of ordinary pipe has resulted from the increase in aggressive effluent waters from industries into the sewer systems. On the other hand, repairs to concrete pipe and replacement of

the pipelines become more and more costly. The price of pipe, therefore, is a less determining factor than in former days; the quality is considered of more importance. In Denmark the local authorities of some municipalities require the mandatory use of Ocrate concrete-pipe, while in Germany and Holland very detailed practical tests have been made with both Ocrate concrete and with the special Ocrate-concrete.

Interest in Ocrate tile is also increasing. Floor problems in the chemical industry and in creameries is cause for concern because the floors must be resistant not only to chemical attacks, but also to the wheel-pressure of forklift trucks and similar means of transport.

## Quality Concrete Training

MATERIAL SERVICE CORP., Chicago, Ill., has inaugurated a large scale training program on quality concrete. Over 100 key employees in the production of concrete have completed the company's school, according to Irving Crown, executive vice-president. The school, under the direction of Charles O'Connell, quality control engineer, is taught largely by Portland Cement Association men, and teaches the properties of quality concrete, how to design a concrete mix, how to properly transport and place concrete, properly cure concrete, and properties of admixes, as well as other related subjects. The course includes motion picture films, lectures, laboratory demonstrations, and question periods.

## Make Tinted Concrete Panels

THE HY-BLOC MANUFACTURING COMPANY at Deschutes, Ore., is manufacturing tinted concrete building panels, 12 in. wide, 6 in. deep, and 7 ft. 9 in. long. The panels are insulated with Zonolite expanded mica, and are waterproofed on the exteriors with plastic Zolatone. The panels, available in 20 different colors, are manufactured at the rate of about 100 daily. Ike Whiteley of Redmond, Ore., owner and operator of the company, has applied for a patent on the building panels, which are marketed through the Hy-Bloc company in Portland, Ore., and the Pamela Lumber company at Deschutes, Ore.

## Installs Autoclave

HOVEY CONCRETE PRODUCTS CO., Sante Fe, N. M., has received a 121-ft., 68-ton autoclave for high pressure steam curing of block.



UNITS CONSISTED OF 90 x 140 FT. studio with 46 ft. high walls, and 50 x 140 ft. technical building, 32 x 140 ft. dressing room and service corridor with 27 ft. high walls. Austin Co., designers and builders. Western Construction News Photos.



20 x 19 FT. UPPER TIER PANELS were erected with 2 pick-up points. On the 20 x 27 ft. lower panels, four pick-up points, two .20 of length from top and two .45 from top, were used. Temporary shores were used until roof trusses were installed. Note nailing strips for acoustical materials, pinned to wall panels before tilt-up.

## 35,000 sq. ft. of walls tilted up in 4 days

THE AUSTIN COMPANY required only 5 months from design to finished structure of this 60,000 sq. ft. three-unit television studio for National Broadcasting Co. at Burbank, Calif. But the fastest part of this fast-moving job was the erection of its 35,000 sq. ft. of walls in 4 days.

This was done by precasting the walls near their intended positions, in 84 concrete panels 20 x 27 and 20 x 19 ft. in area and of 6 in. thickness. After 28-day curing to required 3000 psi strength, the panels were easily tilted up by mobile crane at the rate of more than 20 per day.

Efficient modern construction like this is facilitated by the use of ready mixed concrete, properly processed and poured in place by truck mixers of certified design, capacity, mixing speed and accuracy of water control.



You have a right to insist on this Rating Plate. It certifies compliance with the high industry standards maintained for your protection by the Truck Mixer Manufacturers Bureau.

BLAW-KNOX CONSTRUCTION EQUIPMENT DIV.  
Mattoon, Ill.

CHAM-BELT COMPANY  
Milwaukee, Wis.

CHALLENGE MANUFACTURING CO.  
Los Angeles, Calif.

CONCRETE TRANSPORT MIXER CO.  
St. Louis, Mo.

CONSTRUCTION MACHINERY CO.  
Waterloo, Iowa

THE JAEGER MACHINE COMPANY  
Columbus, Ohio

THE T. L. SMITH COMPANY  
Milwaukee, Wis.

WILLARD CONCRETE MACHINERY CO., LTD.  
Lynwood, Calif.

WORTHINGTON CORPORATION  
Plainfield, N. J.

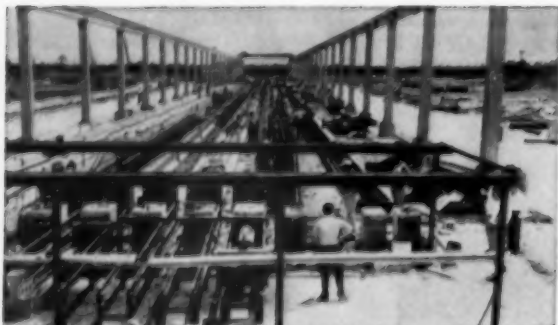
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# WANTED:

## 300,000 BRIDGES!



## New thirteen-year, multi-billion OPENS VAST NEW MARKET FOR



Typical casting bed where structurals are prestressed and cast. The operation is continuous and turns out prefabricated structural members in hours instead of weeks.

**"Big"** takes on a new dimension when applied to the National Highway Program. 40,000 miles of roads. 500,000 jobs. 32½ billion dollars. And about 300,000 new bridges, most of which can be built much faster and more economically with prestressed concrete than with any competitive building material.

It's history's **biggest** order for bridges. A giant demand for present makers of prestressed concrete. And a tremendous opportunity for those who decide to go into the business now.

For **prestressed concrete** construction answers this bridge need as nothing else can. In high degree of strength and permanence. Speed of construction. Savings in time and money. More profit for suppliers and constructors—greater value for taxpayers.

**Bridges and highway slabs** are just two of many uses where concrete prestressed with Union Tufwire



Prestressed I beams ready for transportation by truck, rail or barge. The size of prestressed concrete members which can be cast in permanent site beds is limited only by transportation facilities and regulations. In on-site operations, prestressed girder spans up to 312 feet have been cast.



Hoisting a long beam for quick setting in position. Speed of construction is one of many prestressed concrete advantages. Time saved is money saved—and after construction there are further economies in maintenance.





SEE YOU AT  
ROAD SHOW  
IN JANUARY

# dollar highway program PRESTRESSED CONCRETE MAKERS

strand and wire is proving its structural and economic advantages. Others range from fence posts to complete buildings and warehouses. Almost anything that concrete will do—it will do better when prestressed with Union Tufwire.

## UNION Tufwire...

**Tendon of Strength in Prestressed Concrete**

Union Wire Rope Corporation is geared to the needs of the vast national highway program. Just as we've kept in step with the seven-league strides of prestressed concrete construction since the trend shaped up ten years ago.

Union Tufwire strand and wire is being supplied with on-schedule efficiency to such jobs as the Lake Pontchartrain causeway (longest highway bridge in the world; pretensioned with 3,700 tons of Tufwire strand.) Tufwire is being delivered just as promptly to a rapidly growing list of other customers, large and small. Our expanding plant capacity and Mid-America location assure you that sort of service—today and in the future.

If you're now in the business of making prestressed concrete let our engineering department and research laboratory give you and your consulting engineers a lift with any prestressing problem.

If you're among those who see the big opportunity opening up for new makers of prestressed concrete, let us help you explore the possibilities. It may well be the most important decision you ever make!

**union**  **Wire Rope corporation**

Specialists in high carbon wire, wire rope, braided wire fabric, stress-relieved wire and strand  
2302 Manchester Avenue, Kansas City 26, Missouri



Finished section of the 24-mile bridge which is spanning Lake Pontchartrain (near New Orleans) in record time. Each slab in this colossal causeway is reinforced with 175 Union Tufwire strands.

**union**  
**Tufwire**

**Stress-Relieved  
Wire & Strand**



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*"Our Vibrapacs produce as well today as they did when installed 9 years ago"*

(right) Two Vibrapacs in the Chambersburg plant of the Nitterhouse Concrete Products Co.



(below) Special truck-mounted device for loading and unloading cubed block.



(above) Yard scene showing stockpiles of block, all made on Vibrapacs.



(left) Block are handled with a Besser Bridge Crane Block Cuber. No manual lifting.

This very sincere comment was made by T. K. Nitterhouse, owner of Nitterhouse Concrete Products Company, Chambersburg, Pennsylvania.

Mr. Nitterhouse's first Vibrapac was installed in 1946, and another one was added a year later. Today, both machines are still giving very satisfactory performance. As this enthusiastic block maker puts it: *"The Vibrapac is the best high production block machine available for producing high quality units of all sizes"*.

In addition to standard wall units, Nitterhouse also produces concrete floor and roof systems, pre-stressed beams and split block under the trade name of "Random Rock". Several years ago a second plant was started at Windber, Pennsylvania, where another Vibrapac was installed.

Frankly, don't you think this preference for Vibrapacs implies complete satisfaction?

**BESSER COMPANY • Box 135, Alpena, Mich., U.S.A.**

*Complete Equipment for Concrete Block Plants*



(left) T. K. Nitterhouse pointing to a system of pre-stressed Vibrapac Block beam at the Chambersburg plant. His son William is standing in the background.



NATIONAL HOUSING CENTER, WASHINGTON, D. C., where Besser maintains a permanent exhibit of concrete masonry. Be sure to visit this fine display.



## NEW MACHINERY



### Portable Concrete Mixer

MASTER VIBRATOR CO., Dayton, Ohio, has brought out the "Handy Mixer" portable mixer, which utilizes a portable electric mixing unit that is inserted into a large metal tub in much the same manner as a portable kitchen mixer. The mixing unit slides into a receptacle in the tub, and the entire mixer can be assembled in 30 seconds. The tub has a capacity of five bags of pre-mixed aggregate. The unit is powered by a 1-hp. motor and requires a 115-volt outlet.

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### Fork Lift Truck

PIPER AND PAINE, Nunda, N. Y., recently introduced the Trac-Lift 50, a heavy duty fork lift truck for lifting, transporting, stacking, loading and unloading concrete block and other heavy, bulky concrete products. It handles up to 5000 lb. with an 11-in. underclearance, and features an International Harvester "300" utility motor and chassis. Power steering, hydraulic operated clutch and brakes, and good visibility are incorporated. Other features include: a 136-in. outside turning radius; lifting height up to 10 ft. (additional heights available); power tilt of tower forward 4 deg., backward 10 deg.; five speeds forward, one

reverse; and a 20 m.p.h. road speed. Special equipment includes a 1/2-cu. yd. loading bucket, 6 ft. snow and dozer blade, 8-ft. loading boom, block forks, hydraulic load grabs, load revolving equipment, and LP gas equipment.

Enter 121 on Reader Card



### Loader Truck Body

RUSSELL MANUFACTURING CO., 1328 Maple Ave., Haddon Heights, N. J., has announced the "Hydrahoist" truck body, which mechanizes loading and unloading operations through the use of hydraulic power activated by the truck engine. No auxiliary engines or motors are needed. The body features a bridge-type superstructure of lightweight tubular steel. Adjustable cables, working over roller-bearing trolley wheels, transmit power for lifting and moving as the trolley telescopes forward or backward. Feather-edge controls at the rear permit one man to regulate vertical and horizontal movement. Due to its open framework, the unit can be loaded by fork lift trucks at either side or at the rear. The adjustable cables permit unloading at points as low as 18 ft. below tire level, particularly suitable in handling concrete septic tanks, burial vaults, and other large objects for below-grade installation. A group of nine accessories and attachments is available with the truck body.

Enter 122 on Reader Card



### Cinder Block Curing Heater

ARTHUR C. BAUMANN, 7011-21 Grays Ave., Philadelphia 42, Penn.,

has announced a warm air, low pressure, wet steam process of curing, using a Baumann concrete or cinder block curing heater. In this process, heated, humidified air warms the kiln to the proper curing temperature, maintains that temperature until the block are cured, and with spray nozzles, properly humidifies the air, all automatically controlled by the heating unit thermostat, so that the sprays operate only when heat is being supplied. The heater mounts in the kiln, so that no special boiler room or steam generating station is necessary. The units are fired with LP or natural gas, and are equipped with a copper coil in the front, that produces 214 deg. F. water in a matter of 2 1/4 min. from cold water.

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### Electronic Batching System

THE HELTZEL STEEL FORM AND IRON CO., Warren, Ohio, has developed an electronic weigh batching system which works in conjunction with International Business Machine's punch card system. The system is designated the Helco-matic Batchmaster. The unit is housed in a console, no larger than a standard filing cabinet. Through the use of IBM punch cards, the unit instantly and automatically selects and weighs out the precise amount of any number of materials. The combinations of material weights and selections are unlimited and can be changed instantaneously. Where repetitive batches are required, the unit provides for automatic recycling. A moisture compensating feature permits the elimination of the problem of compensating for moisture by weight.

A controlled closed circuit is utilized to practically eliminate the possi-

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CONCRETE PRODUCTS, August, 1956  
A Section of ROCK PRODUCTS

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bility of malfunctioning due to vibration, moisture or dust. Pushbuttons for all controls are provided for manual batching of individual materials. To facilitate maintenance, all major components of the machine are grouped and set on individual drawers which can be quickly removed, or mounted on panels that swing into a position for easy repairing.

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### Concrete Garbage Unit

DAVIDSON GARBAGE DISPOSAL CO., Wilton, N. H., has forms available for a precast concrete garbage disposal unit. Under a franchise arrangement, forms may be purchased to make the concrete parts of the unit. The unit disposes of garbage by means of a chemical digestive process that is said to assure completely odorless operation.

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### Mobile Radiophone

MOTOROLA INC., Chicago, Ill., has announced a two-way radio rated at 100 watts transmitter output on any channel in 25 to 54 megacycle frequencies.

Housed in a 6- x 15- x 20-in. steel case, the transmitter is capable of 4-channel operation. It operates inter-

changeably between 6 and 12-volt vehicles without modifications.

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### Concrete Block Trimmer

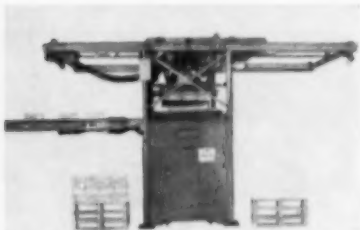
BESSER CO., Alpena, Mich., has brought out the "Pony, Jr.," a lightweight, portable tool for trimming the ends of concrete block. The cutting is done by striking the upper cutting blade holder with a heavy hammer. The tool is designed to cut square or at any angle, and has two 10-in. cutting blades made of high grade tool steel. A rubber hand grip is provided for raising the blade to insert the masonry unit. The opening is 8 in. wide and 5 in. high, and two full-width carrying handles are provided for ease in moving.

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### Masonry Saw

HARRISON & SON, Lyndhurst, N. J., has brought out the Safwel masonry saw featuring "V" carriage wheels and "V" rails for parallel alignment between the cutting wheel and the material on the carriage. A 4-in. back stop supports the masonry unit, preventing it from moving while being cut. Rotation of the cutting wheel locks the unit against the back stop. The saw adjusts for masonry heights from zero to 18 in., and the saw is equipped to cut wet or dry, by turning a selector valve.

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### Pallet Loader

LAMSON CORP., Syracuse, N.Y., has developed a low capacity, fully-automatic loader to meet the needs of a

machine producing from 5 to 20 units per minute. It is designed to handle 48- x 48-in. pallets with maximum load width of 52 in. and length of 50-in. At the present time the loader will handle units with a top diagonal dimension of 21-in.

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### Forklift Tractor

MASSEY - HARRIS - FERGUSON INC., Industrial Division, Racine, Wis., has introduced Work Bull Model 202 Forklift tractor, in which the load is carried over the large rear drive wheels. The tractor has a 42-hp. gasoline engine with 208-cu. in. displacement, gear-driven differential, heavy-duty clutch, six-speed transmission, full pressure lubrication, worm and sector power steering, individual rear-wheel brakes, 12-volt electrical system, and heavy sub-frame which absorbs shock. Lift height is 10 ft. with 3000-lb. load, and up to 20 ft. for lighter loads. The forklift has a 20 deg. forward and 10 deg. backward tilt. If desired, the fork arms can be easily detached and replaced with either a blade or bucket to handle utility and cleanup work around the plant and yard.

Enter 130 on Reader Card



### Block Slumper

COLUMBIA MACHINE, Vancouver, Wash., has developed an automatic block slumper that is said to accurately control slumped block height. When used with a rich plastic mix, the "slumper" produces an unusual variety of designs giving an overall effect like rough hewn stone.

Enter 131 on Reader Card



# WESTINGHOUSE TRANSIT MIXERS



**"COMMON SENSE says your fully-enclosed gear drum drive is better"** *reports owner of large ready-mix fleet*

"As far as we are concerned there are several good truck mixers," says the owner of one of the large ready-mix fleets in the central United States, "but we think the Westinghouse Mixer, with the fully-enclosed gear drum drive, is outstanding—because we feel this particular feature makes real sense.

"Since this drum gear drive runs in oil it obviously eliminates abrasive

*This feature eliminates all exposed chains and gears. Greatly reduces maintenance costs.*



wear . . . constant lubrication . . . and high maintenance costs. We have 10 mixers with this type of drive and their maintenance has been nil."

This owner's experience shows that the exclusive, patented Westinghouse gear drive requires no more time and attention than a conventional-type automobile transmission. With this type of drive there is no chain to become too tight or too loose from truck frame weaving . . . no open pinion drive to wear out from abrasion and misalignment.

## CHECK BEFORE YOU BUY

Westinghouse Transit Mixers have many extra features for increased performance and longer life. Ask your W.T.M. distributor to show you one of these mixers in action. Find out for yourself why these are the mixers that day-in and day-out do more work, in less time, at lower cost—at the end of the year prove to be your best transit mixer investment. For more information write for our new Bulletin 256.



**WESTINGHOUSE TRANSIT MIXER DIVISION**  
**LeTourneau-Westinghouse Company**

**I N D I A N A P O L I S , I N D I A N A**

*Enter 1129 on Reader Card*

CONCRETE PRODUCTS, August, 1956  
A Section of ROCK PRODUCTS

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Geo. A. Fry, newly elected president, left, awarding certificates of recognition to the outgoing president, Chas. O. Dittrich. Vincent P. Ahearn, executive secretary of N.R.M.C.A., seated, to the left

## Ohio Ready Mix Producers To Get Tested Cement

**T**HE OHIO READY MIXED CONCRETE ASSOCIATION learned at the annual convention that certain state highway specifications will be eased; visited an electronically controlled concrete batching plant; and heard addresses by Robert Mitchell, president and V. P. Ahearn, secretary of the National Ready Mixed Concrete Association.

Officers elected at the Cleveland meeting include: president, George A. Fry, Dayton Builders Concrete Corp.; vice-president, R. H. Slugg, Hamilton Gravel Co.; treasurer, Ralph Anderson, Anderson Concrete Corp. Elected to three year terms as directors were: C. O. Dittrich, Hilltop Building Materials, Inc.; George Goetz, Jr., Clifton Concrete and Supply Co.; and W. A. Rodgers, Basic Construction Materials Co. R. W. Ochenshirt will serve the unexpired term of Mr. Slugg, former director.

The state will test all cement which a state contractor or subcontractor specifies, according to a report by Gordon Lewis, chairman of the Specifications Committee. He said that under this program it will not be necessary to maintain separate storage facilities for state-tested cement since all cement used at the plant will be tested—on request—until completion of the state contracts. Under no condition will the State Highway Dept. accept concrete other than that containing state-tested cement.

Mr. Lewis also stated that Ohio specifications scheduled for issue in January will require all coarse aggregate delivered between May 15 and

Oct. 16 to be in a water-saturated condition. Ready-mixed concrete specifications will be changed to allow a 2-in. slump instead of the present 1-in. slump, and the range for air-entrained concrete is expected to be reduced to 4-5 percent air-entrained from the present 5-7 percent.

The state probably will issue a specification limiting blade wear on truck-mixers. A. C. Thomas, Jaeger Machine Co., who is working with the state on this matter, said that in his opinion allowable blade width wear will be set at 15 percent.

President Robert Mitchell of the national association pointed out that intangible benefits are realized by members of national and local ready-mixed concrete groups. In the thirties cut-throat competition was forcing Los Angeles producers to the wall. In 1940 a local association was formed through which the operators were able to find solutions to common problems and get the industry back on its feet economically. Since that time, the local association has grown strong. Recently, the cohesiveness of its members enabled a 29-company group to withstand the pressure of a teamsters union strike despite blandishments to several of the companies.

Production of ready-mixed concrete in 1955 was estimated at 70,000,000 cu. yd. by Vincent Ahearn, executive secretary, N.R.M.C.A., on the basis of replies to the annual national survey. The average value per cu. yd. of concrete was \$11.89. Home building accounted for 34 percent, commercial

construction 15.8 percent, industrial construction 14.4 percent, 10.4 percent in street and highway construction, and 9.7 percent public works. Cement used by ready-mixed concrete producers amounted to one-third of United States production.

An interesting trend in the growth of larger companies was revealed by the survey, which showed that 0.9 percent of the companies produced 15 percent of U. S. ready-mixed concrete while 65 percent of the companies accounted for only 20 percent of production. Between June and November, 1955, 24 of 26 reporting Ohio companies experienced a cement shortage.

Capital insights were a provocative section of Mr. Ahearn's address. He spoke of personal contacts with President Eisenhower and of various activities in legislative circles.

Inspection of the electronically controlled concrete batching plant of Cleveland Builders Supply Co. gave association members a chance to evaluate the new punched card system (R. P., July '55, p. 131). The tour had been well planned by company executives and the lively questioning by guests indicated great interest in the punched card method of automatic control. Mr. Thorsson, Fairbanks, Morse research engineer and one of the plant's developers, explained the basic electrical and engineering principles involved.

Only four men operate the entire plant that supplies a fleet of 34 trucks. It was the first to install the Butler batching system, which uses a perforated card to indicate the specified weights of materials for a mix. The card is placed into a slot and "read" by the machine; the operator presses a button and the mix is automatically proportioned for discharge into the mixer or to a bulk materials truck.

Outgoing president Charles O. Dittrich reviewed the service activities performed by O.R.M.C.A. These include sponsorship of a driver safety short course at Michigan State, an annual ready-mixed concrete short course given at various locations, and ownership of three films that are offered to members for use.

Challenges to the association exist in several fields. Mr. Dittrich strongly advocated adoption of an industry code of ethics that would promote good will by assuring quality products to ready mix purchasers. Public relations should be given more consideration by association members; use of driver safety programs was suggested as an excellent way to start. Solid growth of the association took place under Mr. Dittrich's administration;

(Continued on page 294)

# NEED A RIGID FRAME?

**Use precast prestressed concrete!**



A gymnasium at Lynchburg, Tennessee. Rigid frames on 20-ft. centers. Span 62 feet. Prestressed girder of rigid frame is 3 feet deep... connected to precast reinforced columns and made continuous by welding reinforcing bars projecting from each member. Deck between frames is 6-in. deep prestressed concrete channels.

SINCE THE FIRST simple span bridge in the United States was completed in 1950, plant-fabricated prestressed concrete members have come a long way. As pictured here, all the advantages of continuous girders, rigid frames and long spans can now be combined with the economy and durability of precast pre-tensioned bonded prestressed concrete members.

Today, because of continuous development and participation in all types of prestressed projects, Roebling is the foremost supplier of tensioning elements in the industry. Why not turn to "headquarters" for suggestions and advice on specific applications? Write Construction Materials Division, John A. Roebling's Sons Corporation, Trenton 2, New Jersey.

All structures illustrated were designed by Ross M. Bryan, Consulting Engineer... girders fabricated by T. L. Herbert & Sons... joists, slabs and channel decks fabricated by Nashville Brecko Block and Tile Company, all of Nashville, Tenn.



Parking garage at Nashville, Tenn. Girders span 38 feet. Continuity is obtained over columns by lapping reinforcing bars on tension side and pouring small amount of concrete in-place. Deck between girders is prestressed channels spanning 28 feet.



Girder for gymnasium at Milan, Tennessee. 100-ft. span girders 5½ feet deep spaced 20 feet on centers. 7-wire strands are deflected to approximate parabolic cable curve desirable on long spans. Strands are pre-tensioned, deflected, and then the concrete is poured. Deck is 8 inch x 12 inch prestressed block joists on 5-ft. centers and covered with precast lightweight slabs.

# ROEBLING



Subsidiary of The Colorado Fuel and Iron Corporation



Enter 1130 on Reader Card

CONCRETE PRODUCTS, August, 1956  
A Section of ROCK PRODUCTS

## Noble-Mobile batching plant on wheels



**lets you batch at site of  
fringe jobs and makes  
those jobs pay**

Haul Noble-Mobile to job site like a semi-trailer • Set up in one day—no field wiring, concrete footings or crane time required on base plant • Charge aggregates with front end loader, crane or conveyor • Plant utilizes bulk cement—cement batched automatically



Photo of post-flood reconstruction job in Shelton, Conn., using Noble-Mobile. Owner: Silliman & Godfrey, ready mixed concrete.

• Excellent quality control • Maximum production from mixer trucks—short hauls, more yards per day • Production capacity 60 to 100 yards per hour. Covered by patents pending.



### **NOBLE BATCHING PLANTS**

Portable, semi-portable or stationary plants designed and built by Noble Company • 1860 - 7th St., Oakland 20, Calif. TEemplebar 2-5785



Other Noble Company offices: 20950 Center Ridge Road, Cleveland 16, Ohio. EDison 1-3426.  
518 First Ave. North, Seattle, Wash. MUtual 4878 • 117½ W. Manchester, Inglewood, Calif. ORegon 8-4457.

International Sales Agent: Frazar International Corp., San Francisco

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Enter 1084 on Reader Card





By E. L. HOWARD  
and JAMES IDA

Hammer readings are taken on cylinders prior to capping and testing for compression

## No Resale Value In Second Hand Concrete

**S**ECOND HAND CONCRETE unlike used cars has no resale value. Condemned concrete in any type structure can give the ready-mixed concrete operator some troubled hours and expensive experiences.

An alert service man and a quality control program will prevent faulty concrete or at least quickly correct defects as it is delivered. A contractor placing concrete has the right to expect uniformity in consistency and workability. He can justly expect delivery without long delays between loads and in equipment that will mix and discharge properly. The owner can rightly demand materials and proportions that meet the specifications. Anything less than this can properly be grounds for rejecting the concrete.

**A producer of quality concrete is duty bound to establish control practices** that insure full compliance with specifications. His service department should go the "second mile" and spread the doctrine of good concrete practice to customers using this perishable commodity, concrete. After forms are stripped, unsightly rock pockets and cracks are not favorable advertisement for a ready mix plant. The concrete producer though not at fault,

likely could have prevented some of the trouble by a wise word here or there among the users of quality concrete.

If the owner's inspector is careless with test specimens a full scale defensive action must be launched by the concrete supplier; these concrete cylinders can be the excuse for the owner to demand new concrete for the old. The producer's plan of defence should be positive and constructive. Perhaps the first move would bring to the attention of those concerned all improper practices in sampling and testing. He should make some check tests to verify the quality of the concrete on delivery. Data on strengths of similar concrete mixes from other jobs as well as efficiency ratings of the batch plant operations are necessary aids in determining the over-all quality of the concrete delivered. Some special studies to locate possible causes for low strength cylinders are always constructive defensive action.

Unexplained low breaks on a large warehouse job inspired some comparative testing of concrete cylinders, including type of molds, manner of casting, difference in job storage conditions, and methods of delivery to laboratory. Results of these studies are shown in Table 1. The data proved non-standard practices yielded low breaks. The remaining concrete was placed without trouble because sampling and testing was brought up to standard.

During construction, the concrete test hammer, which measures the hardness of the concrete surface under test, is a valuable tool in the control of quality concrete. The type of aggregates and the brand of cement has some effect on the rebound number, and the kind of forming and the manner of finishing will affect the reading of the hammer test. These conditions do not change greatly from job to job and the careful operator will be able to

(Continued on page 288)

Type of Molds	Temperature on Job Storage	Shipped to Laboratory by	Comp. Strengths 28 day psi
Paper	65F-75F	Messenger	3900
Paper	65F-75F	Express	2610
Paper	50F-90F	Messenger	3540
Metal	65F-75F	Messenger	4110
Metal	65F-75F	Express	2540
Metal	50F-90F	Messenger	3960



## They're swapping minutes for dollars!

### Worthington MIXERAMA proves on your job that a Hi-Up Mixer earns more for you!

You're looking at the unique new truck mixer demonstration that's got the Ready-Mix industry buzzing!

Hundreds of Ready-Mix men are finding out at MIXERAMA that no other truck mixer is in the same league with the Worthington Hi-Up. MIXERAMA is an eye-opening exhibition of Hi-Up performance — *and you see it at work right on your own job!*

Sure, we're proud of the Hi-Up Mixer. So proud, in fact, that we make a special point at MIXERAMA of letting you do just about anything to the Hi-Up that strikes your

fancy. Try out the clutch... swing out (or on!) the sturdy discharge chute... climb *inside* the drum (of the Cutaway Mixer)—we want you to see for yourself just why we say the Hi-Up Mixer is your best buy... why no other mixer is in the same league when it comes to delivering *more uniformly mixed concrete faster!*

Tell your Worthington distributor you want to see MIXERAMA, with a Hi-Up loading at your plant and then delivering concrete to your current job. Or watch MIXERAMA in your area—your distributor will set up the date. It's the most convincing demonstration you've ever seen. And it's staged under operating conditions that *you* select... the tougher, the better! Call your Worthington distributor today and tell him you want to see MIXERAMA right away.



## "MIXERAMA showed me how Hi-Up delivers better concrete faster!"

E. B. MC LENDON

**North Carolina Ready-Mix Operator Says, "After a MIXERAMA demonstration I signed up for a Hi-Up"**

Mr. E. B. McLendon, of B. H. McLendon Concrete Company of Albemarle, is strictly from Missouri when he's shopping for a concrete mixer. He's got to see for himself. And Worthington's MIXERAMA demonstration enabled him to do just that. Here's his enthusiastic report:

"Worthington MIXERAMA is the most convincing on-the-job exhibition of a concrete mixer I've ever seen in this business. Why, they even let me climb right inside the drum, and find out for myself how it's built."

### Features that sold Mr. McLendon

"What I especially liked about the Hi-Up is its heavy-duty transmission. It's the only one I've seen that's designed specifically for truck mixer operation. Our driver tells me the Hi-Up is unusually easy to handle and keep clean."

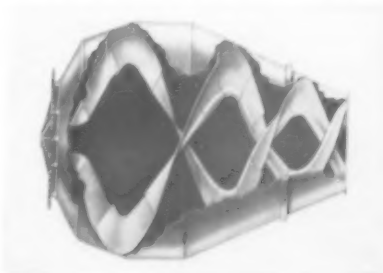
But the main reason I signed up on the spot is the way the Hi-Up mixes concrete so thoroughly and discharges it so fast—even a low-slump mix. After all, that's the pay-off—the ability to deliver more uniformly mixed concrete faster."

### See MIXERAMA soon

Make a date today to see Worthington MIXERAMA as soon as possible. Call your Worthington distributor. Worthington Corporation, Concrete Machinery Division, Section R.6.1B, Plainfield, New Jersey.



Mr. E. B. McLendon purchased this 5½ yard Hi-Up Mixer after seeing it in operation at a MIXERAMA demonstration.



Beating this drum is impossible! Drum and blades are made of abrasion-resistant steel. Blade design gives thorough mixing, fast discharge. Advanced water system for precision mixing.



# WORTHINGTON



If It's a Concrete Job, It's a  Job

Rock Drills • Wagon Drills • Pavers • Concrete Mixers • Portable Pumps • Portable Compressors

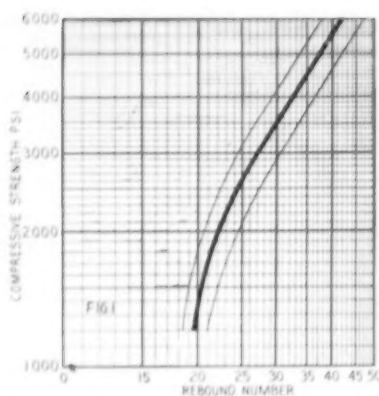


Fig. 1: Test data curves representing Kelly ball tests on 300 cylinders, including a wide range of materials and concrete mixes

determine quite accurately the relative strength of concrete in a structure being tested. The use of the hammer can be extended to practical construction service; when to strip forms, when to apply loads, and other strength gain information can easily be obtained by this method.

The reproducibility of hammer readings is very good. The compressive strength-rebound relationship is subject to deviations of the same magnitude experienced with the compression test results, plus the extremes of surface conditions in the concrete under test.

Test hammer and compression strength data should be gathered as the concrete work proceeds. When that inevitable low cylinder occurs, areas of the structure represented by the cylinder can be tested with the hammer. And from the compressive strength, the rebound number relationships, already established on the job, the low cylinder break might be proven in error.



Here the hammer is being used to test the roof beam of a warehouse

More often the ready-mixed concrete producer, with rejected concrete to explain, is faced with the problem of no strength-rebound data from the job. To meet this problem, curves have been established by several agencies using data taken from other projects that might very well be sufficient to meet the producer's need. Such data is shown in Fig. 1.

These curves represent more than 300 cylinders and include a wide range of materials and concrete mixes used in Northern California. The lines of deviation are not excessive and compare favorably with the deviation to be expected with compression cylinders. When used with these data, the hammer is used in a horizontal position. The manufacturer supplies a correction factor for tests made at other angles.

### Ready-Mix Operation

BASIC CONSTRUCTION MATERIALS DIVISION, New York Coal Co., Columbus, Ohio, has opened its recently built ready-mixed concrete plant at Ironton, Ohio. Coarse aggregate for the plant is furnished by the Plum Run Stone Division plant at Peebles, Ohio. This plant features manufactured sand as a fine aggregate but also has a natural sand available. It is fully equipped for heating and to receive cement by either rail or truck. The coarse aggregate and manufactured sand is brought in by railroad cars, is unloaded by a short unloading conveyor or discharges into a hopper of powered radial stacker with a capacity of 4000 tons. A  $\frac{3}{4}$ -cu. yd. clamshell is used to load a hopper at the foot of a 24-in. inclined conveyor going to the turnhead at the top of the plant. The plant can dry batch dump trucks for pavers and batch ready-mixed concrete trucks without making any changeover in the plant set-up.

The bin and cement facility was manufactured by Butler Bin Co., Waukesha, Wis., and the conveying system

was supplied by Columbus Conveyor Co., Columbus, Ohio. The plant has a capacity of 200 cu. yd. per hr., either dry batch or ready-mixed concrete. The charging hopper of the plant is 5-cu. yd. capacity, and the conveyors can be operated either from the plant itself or in the area of the stacker conveyor. The plant is also equipped for night operation.

### Precast Concrete Roof Slabs

PRESTRESSED, PRECAST CONCRETE ROOF SLABS, used on a 16-room elementary school building in Jacksonville, Fla., have resulted in a lowered overall school construction cost, according to Albert R. Broadfoot, supervising architect of the Duval County Board of Public Instruction. The slabs were installed by the contractor, D. F. McMains & Sons of Jacksonville, and were manufactured by Capitol Concrete Co., Jacksonville, and lifted into place by crane. The 312 slabs were poured at the plant with six steel cables in each, and were pretensioned to provide 7 tons strength. The slabs, 4 ft. wide, 30 ft. long and 2 in. thick, were coated with roofing paper, hot tar and gravel after they were placed in the roof system.

### Masonry Group Organized

OREGON CONCRETE MASONRY ASSOCIATION was recently organized to promote further use of concrete masonry. The first state-wide meeting was held in January, 1956, at which time officers were elected and by-laws were drawn up and adopted. The second meeting was held in April at Eugene, Ore., with the following committee men present; Frank Spangler and Cal Flemly, Portland, Ore., and Bill Murphy, Salem, Ore., promotion; Selby Leep, Roseburg, Ore., Lee Grimes of Bend, and Jack Ellis of Myrtle Point, membership; and Ken Bergstrom of Vancouver, and Paul Nutt, Portland, Ore., materials testing.



Ready-mixed concrete plant at Ironton, Ohio, recently opened by Basic Construction Materials Division, New York Coal Co., Columbus, Ohio

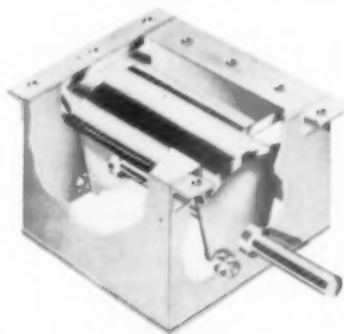


# WHEN SIZE IS A FACTOR...

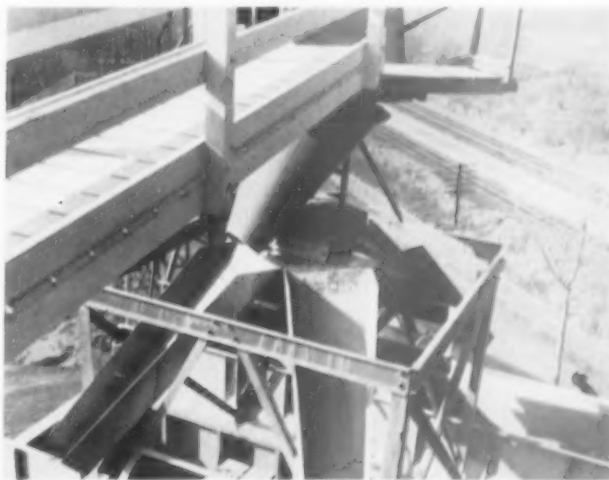


## design with FANNING SCHUETT

The concrete plant in the photo at the left features an elevator with a built-in safety factor . . . the excess strength which insures against breakdowns. A 100,000 pound chain drives the elevator from a special head sprocket which is made of demountable hardened steel rims. The easy replaceability of these rims is another example of the superiority of Fanning-Schuett design. When you need equipment with designed economy and a built-in safety factor of increased operating strength, specify FANNING-SCHUETT.



This rotary valve is a strong and sturdy steel unit with built-in resistance to corrosion and wear. It has been described as one of the most efficient and dependable units in the field. Built with an anti-friction bearing and machine finished gate plate, the Fanning-Schuett rotary valve is an extra you will certainly want in your next installation.



This power-operated swivel chute with push button controls serves the several points of a multiple compartment batching bin. The ease of operation as well as the convenience of this type of swivel chute is a FANNING-SCHUETT extra which you can build into your next cement plant.

### **JOBS IN PROGRESS**

- **WARNER COMPANY, Philadelphia, Pa.** . . . Completely new plant at Porter Station below Wilmington, Delaware. New plant is arranged for central mix. Also set up for loading dry batch and/or sand or stone.
- **COMMERCIAL CONCRETE CO., Morristown, Pa.** . . . New plant and additional facilities to include separate scales for cement batching, fly ash and aggregates with semi-automatic controls.

### **FANNING-SCHUETT ENGINEERING COMPANY**

4325 N. Third St.

● Philadelphia 40, Penna.

Enter 1175 on Reader Card



**Left:** One of the more recent additions to the fleet of mixer trucks receiving a load of concrete from the batching plant mixer.



**Right:** Louis Huckabay, batching plant operator, making up a mix

## Efficient Layout Serves Both Ready-Mix and Block Plants

### BUILDING SUPPLIES

. . . of all kinds supplied by Crowe-Gulde Cement Co., Amarillo, Texas in addition to block and ready-mixed concrete

By HUBERT C. PERSONS

WHILE THE POPULATION of Amarillo, Tex., has tripled in the last three decades, the net dollar volume of that city's 30-year-old Crowe-Gulde Cement Co. has expanded—to \$2 million. Crowe-Gulde has demonstrated the advantage of establishing a concrete business in a fast growing city. Sales volume, say company executives,

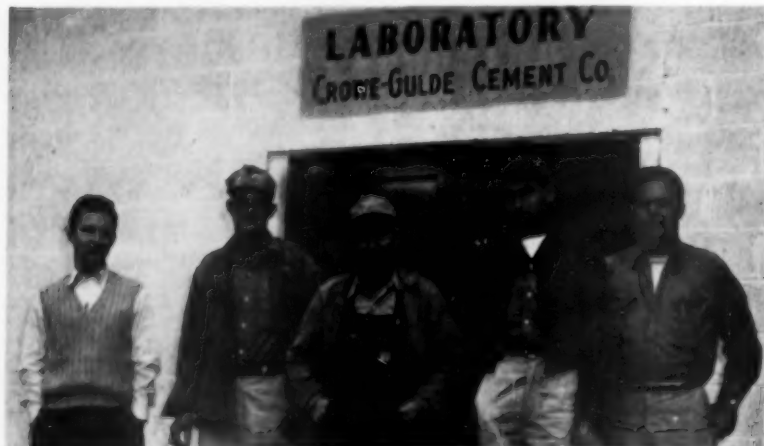
was bound to increase because of the doubling and redoubling of the population. When the company started a small builder's supply business of hard materials in 1926, Amarillo, now a trade center of 160,000, had a population of less than 40,000.

Since its founding, the company has added a ready-mixed concrete plant and

a concrete block plant. Today the Crowe-Gulde ready-mixed concrete plant, the second such plant to be established in Texas, now operates 19 Rex mixer trucks of which ten have a 2½-cu. yd. capacity. Of these 2½-cu. yd. mixers, five are powered by Reo Model C 22T engines and five by Reo Model E 22's. The fleet also includes three 5-cu. yd. mixer trucks on Reo-ten-wheel tandems; one 5-cu. yd. mixer on a White truck and three 7½-cu. yd. mixers on White ten-wheel tandems.

Cement delivered to the plant in hopper bottom cars is dumped into an under-track hopper. A screw conveyor takes the cement to a Webster bucket elevator which carries it up 75-ft. to a 600-bbl. storage silo. A ground storage bin holds an additional 1200 bbl. of cement.

Sand and gravel aggregate, received by rail and truck, is dumped into an underground hopper. From the hopper an 18-in. Pioneer belt conveyor carries the material to a horizontal shuttle belt over a seven-compartment elevated bin. This bin is 20-ft. high, 18-ft. wide, and 150-ft. long. The shuttle



**Left to right:** Joe Gulde, A. E. Burnett, Chick Slager, Tom Whitacre, and "Red" Gillespie

# Electronic-Hydraulic Automation *Yields*

Increased Output

Lower Costs

Greater Profits

IN THE

## KENTHREE

### Plain Pallet Machine with Front Pallet Return

KENTHREE with front pallet return is an example of modern engineering in which the factor of human fallibility is entirely eliminated.

Electric driven hydraulic members permit extreme simplification with a marked reduction in operation and upkeep costs.

The amount of material, the time of agitation and vibration, the size of the block, the forward movement of finished blocks are all controlled electronically and hydraulically.

The KENTHREE automatically delivers three 8 inch blocks or equivalent of accurate dimension and uniform density each cycle with any aggregate.

GET THE COMPLETE STORY QUICKLY

**The KENT MACHINE CO.** CUYAHOGA FALLS OHIO  
DIVISION OF THE LAMSON & SESSIONS CO.  
CONCRETE PRODUCTS MACHINERY SINCE 1925

Canadian Distributor: Wettlaufer Equipment, Ltd., 49 Merton St., Toronto 12, Ontario

The offbearer picks up two pallets of finished block from the automatic front pallet return and simultaneously by using a magnetic spade, drops two empty pallets into the machine, one of which moves into position at each cycle.

This advanced designing and operation gives new remarkable results with which you should be familiar.

#### FILL IN AND MAIL COUPON

KENT MACHINE CO., Cuyahoga Falls, O.  
Send literature illustrating and describing the KENTHREE.

To attention of \_\_\_\_\_  
Company \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_



Aggregate storage, to the left, and batching plant, to the right, with line-up of some of the mixer truck equipment

belt, 75-ft. long, can feed into any one of the seven bin compartments. About 700-cu. yd. of sand and 920-cu. yd. of coarse aggregate in sizes from  $\frac{3}{4}$ -in. to 1½-in. are kept on hand. About 100 cu. yd. of fine and 200 cu. yd. of coarse aggregate are stored for lightweight concrete production.

A reclaiming tunnel belt conveyor, 165-ft. long, runs under the elevated bins from which aggregate of required sizes may be fed to a belt conveyor inclining up 235-ft. to the top of the batching plant.

An 84-cu. ft. Smith mixer in the batching tower is fed by a Blaw-Knox automatic weigh batcher. Flake calcium chloride is used for winter concrete. Hot water is supplied by a 50-hp. vertical Lookout boiler which maintains a 4300-gal. hot water tank at a temperature between 170 and 180 deg. F. Ready-mixed concrete production averages 200-cu. yd. per day.

Expanded shale aggregate from two different suppliers is used to make lightweight concrete masonry units sold under the trade name "Haydite Bloc." The aggregate is unloaded into one of two pits under Rock Island spur tracks. A Link-Belt bucket elevator takes the aggregate to a shuttle belt which distributes into one of two bin compartments over batching tower.

Block are made on a Besser Vibrapac block machine producing about 7000 standard 8 x 8 x 16-in. equivalents in a 9-hr. day. A 50-cu. ft. Besser mixer serves the block machine. Water content of the concrete mix is regulated by a P & S moisture meter.

There are five curing rooms each holding from 22 to 30, 72-block racks. Three different makes of fork lift trucks, each of 4000-lb. capacity, are used to take block from the Besser machine to the curing kilns. These fork lift trucks are a Yale, a Clark, and an Erickson.

The block remain for 2 hr. at normal temperature after which wet steam is turned into the kiln, gradually raising the temperature to 175 deg. F. After steaming in the 175 deg. temperature for two hours, the block are allowed to soak in the kiln for 10 hr. with the steam turned off. At the end of the curing cycle the block are removed from the kiln to the cubing area where any culls are removed before the block are cubed and stockpiled. Steam for curing is supplied by a 100-hp. Donovan boiler.

In June, 1955, the plant began using limestone aggregate to make a new product sold under the trade name, Color Crest Stone. This is a Roman-type block split to 2¼ x 15½ x 3½-in. on a Besser Bestone block splitter. A full range of ten colors and white are made, including pinks, browns, greys, buff, green, and Chinese yellow.

A plant laboratory equipped to make all standard A.S.T.M. tests, including sieve analysis, adjoins the concrete plant. Equipment includes a 100-ton Jones compression testing machine. Joseph F. Gulde, sales engineer is in charge of the laboratory.

In addition to fork lift trucks, mobile equipment used in the plant includes two Reo and one White flat bed, bob-tail trucks and three White tractor

semi-trailers with American Trailer Co. floats. Two of the White trucks are equipped with Superlite unloaders and one with a Jiffy-Lift unloader. These are used to deliver block. The bobtails are also equipped with hydraulic dump beds and have 1-ft. high sideboards so they may be used for hauling gravel or sand.

The company also has a 2-cu. yd. Model M-7 Mixermobile, a portable four-compartment Binabatch made by Winslow Scale Works and a Quick-Way crane to charge the portable plant, unload cars or place concrete. The Binabatch capacity is 45 tons with a 2-cu. yd. batcher. This portable equipment was used during 1955 on the construction of a grain elevator at Friona, Tex.

In addition to ready-mixed concrete and block plant operations, the Crowe-Gulde activities in Amarillo embrace a building supply business with more than 1500 items in stock, including steel and aluminum windows and a big list of nationally advertised building specialties.

The owners of the Amarillo plant also own a dry batch ready-mixed concrete plant at Hereford, Tex., 50 mi. south of Amarillo. This is operated by a separate corporation—the Crowe-Gulde Concrete Co. Equipment at the Hereford plant includes a 7½-cu. yd. Rex mixer on a ten-wheel Reo truck; two 2½-cu. yd. Reo-Rex six-wheel mixer trucks and one Jaeger 3-cu. yd. mixer on a Ford F 800 truck. There is also a Barber-Greene undercar unloader and conveyor from unloader to stockpile. A Scoopmobile with a ½-cu. yd. hydraulic front end loader is operated in the plant yard.

The Crowe-Gulde Cement Co. uses substantial space regularly in Amarillo newspapers, size of space varying up to one-half pages. Radio is used for spot announcements three times a week. The new Color Crest Stone was the feature of an elaborate display at the 1955 Tri-State Fair. A display of concrete masonry and accessory building products is maintained in the company's general office.

The business, which is now the Crowe-Gulde Cement Co., was established in Amarillo as a branch of Francis J. Fisher, Inc., Denver, Colo. in 1926. In October, 1927, the business was organized as Crowe Lime & Cement Co., Inc. In December, 1942, the name was changed to the Crowe-Gulde Cement Co. All the stock is owned by the Crowe and Gulde families. Officers are Charles T. Crowe, president; Stanley R. Crowe, vice-president, and John F. Gulde, vice-president and treasurer. Directors are Joseph F. Gulde and the above named officers.

(Continued on page 296)





Right to Left  
FRED NETH  
President  
WALTER NETH  
Sales  
Manager  
OTTO NETH  
Plant  
Superintendent  
PAUL  
KLEMENS  
Asst. Sales  
Manager



# *Columbia's* **SERVICE**

## **BEGINS WITH YOUR FIRST INQUIRY**

From your first letter, wire or phone call, the skill, knowledge and experience of everyone on Columbia's staff is at your disposal! Regardless of *what* your problem involves — plant layout, technical advice or mechanical assistance—a factory-trained Columbia representative will be in your plant within 24 hours.

Columbia engineers, combining years of practical experience in the field of concrete block machinery, are always available to help you work out your most complex manufacturing processes and details.

At Columbia, service neither starts nor stops at the time of purchase. It begins with your *first inquiry* — and continues for the life of your machine.

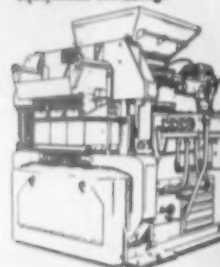
**FASTER PARTS SERVICE.** Because Columbia's plants in Vancouver and Mattoon, Illinois, are strategically located near air and rail centers, regular and emergency parts can be shipped immediately to any part of the United States.

If you are planning a plant expansion, a new plant, a machine installation—or would like to add concrete block production to your present business—contact us and we will send you a representative immediately. There's no obligation. Phone OXford 4-1501.

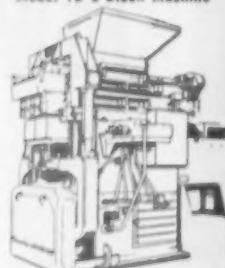


*Columbia* **MACHINE**  
Home Office: 107 S. GRAND, VANCOUVER, WASHINGTON  
Factory Branch and Warehouse at Mattoon, Illinois.

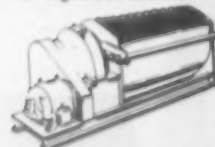
Columbia Builds a complete Line of Concrete Block Plant Equipment including:



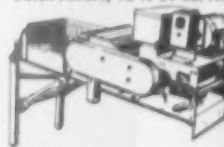
**Model 12 3-Block Machine**



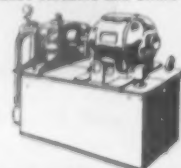
**12"-High Block Machine**



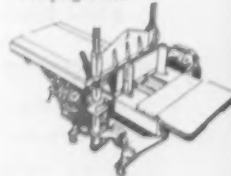
**Batch Mixers, 12 to 81 cu. ft.**



**Pallet Cleaners and Oilers**



**Pumping Units**



**Automatic Block Splitter**

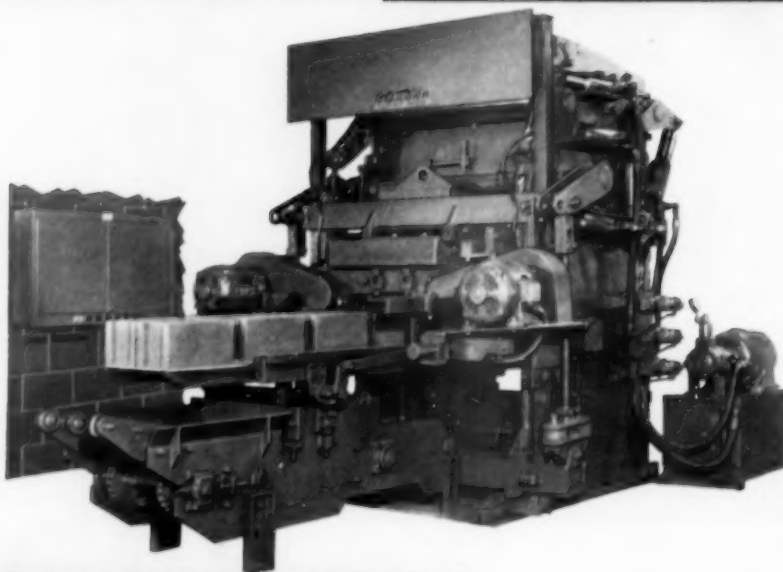
**Food Drawer Agitators  
Power Rollways  
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Racks  
Turntables**

District Offices in: Wisconsin, Illinois, South Carolina, Mississippi, Florida, New Jersey, Virginia, California, Massachusetts, Texas, Montreal, Toronto, Vancouver, British Columbia.

HIGH PRODUCTION  
2X and 2½X

LOW COST

NEW!

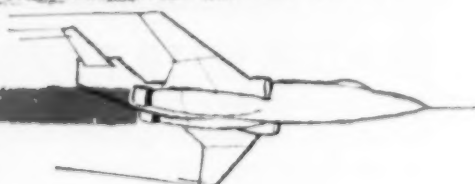


NEW!

WITH THE GOCORP

*jet*

Here's a low cost, durable, plain pallet block machine that will give you jet age production of blocks you can brag about. The JET builds profits for you that won't be eaten up by maintenance and the burden of frequent replacement.



### JET FEATURES THAT MEAN PRODUCTION AND PROFIT!!!

- **JET PRODUCTION**—Conservatively rated at 600 good blocks per hour.
  - **JET QUALITY BLOCKS**—Quick change feed and strip time controls to handle troublesome mixes
    - Automatic, low voltage height control
    - A block receiver that babies your most fragile blocks—no jolts or jerks.
  - **JET HYDRAULIC DRIVE**—For swift, smooth, effortless motions.
  - **BUILT TO LAST**—Rugged frame has full 1" side plates—thoroughly braced with plate and structural members • Motors, pumps, shafts, single acting cylinders are all oversized for real staying power • Plug stop reversing vibrator motors—no brake failures.
  - **ACCESSIBLE**—Working parts are where you can get at them • No pit required • Easy to adjust
    - Easy to clean • Easy to maintain • Change full height molds in about 20 minutes—to other heights in about 30.
  - **TWO VERSATILE SIZES**—Either 2X or 2½X.
- For higher production at a lower unit cost, write today for your brochure on the GOCORP JET.

**OTHER GOCORP EQUIPMENT**—The "Trustee" (3X husky brother of the "Jet"), "King" (6X) and "Senior" (3X) Plain Pallet Machines • "Junior" Cored Pallet Block Machines (Single or Twin Models) • Mixers and Skips (up to 75 cu. ft.) • Allied equipment.

**GOCORP**  
**ADRIAN-MICH.**

407 Grace Street

Adrian, Michigan

# TRUCK MIXER MAINTENANCE

By JAS. A. NICHOLSON\*

**43: A producer views the ready-mixed concrete business. This is the third article on truck mixer care**

**I**N OPERATION AND CARE OF TRUCK MIXER ENGINES, the most important advice that can be given is that the engine manual be most carefully studied by both the driver and the mechanic. Before undertaking any important maintenance work, a mechanic should be sure, by experience and careful study of manufacturer's instructions, that he knows what he is doing. Each make of mixer engine has its own special features. Unless a mechanic understands these special features, he can quickly get himself—as well as the engine—in real trouble.

A good mechanic realizes that proper daily operation and care by the driver are principal factors in determining the amount of maintenance attention that will be required by any mixer engine. A good mechanic insists that a driver properly warm up his mixer engine each morning, operate the unit properly on each trip, make every effort to avoid engine idling, regularly "rev" up engine to eliminate carbon buildup, and daily perform prescribed "care" duties. The mechanic sees to it that oil levels are checked; oil filter element changed; air cleaner, spark plugs, and distributor serviced; fluid coupling inspected; clutches and brakes adjusted; battery cable examined; and all other periodic maintenance duties performed as scheduled. A good mechanic knows the engines inside and out, is a good trouble shooter, and is skillful in both tuning up and overhauling engines.

In mixer engines, torque is the prime concern; horsepower is relatively unimportant. This fact has led many mixer manufacturers to use smaller automotive type engines. Except when necessary, high speed mixer engines should not be operated at idling speeds. Idling leads to carboning up of an engine and burning up of the valves. On units equipped with fluid couplings, idling also leads to slippage. A good mechanic makes certain that a driver is properly advised on engine r.p.m. operation and follows up any evidence indicating lack of driver cooperation. Motors should be kept above 500 r.p.m. It is actually preferable to operate the mixer engines around 800

r.p.m., which produces a drum rotation of approximately  $3\frac{1}{2}$  r.p.m.

Adequate preventive maintenance is especially important with the mixer engine. An engine, improperly maintained, won't last long. Filling the gas tank and checking the oil won't prove to be sufficient attention. Many engine parts travel at fast speed. Unless given proper care, these parts will show rapid wear. Frequent servicing of the air cleaner and the oil filter is a "must" along with regular lubrication. No chance should be taken on dirty oil and low oil levels. There should be periodic timing of engine r.p.m. and a frequent engine "tune up". Each required maintenance service on the mixer engine should be carefully carried out.

Truck mixers using the Chrysler industrial engine are probably equipped with a fluid coupling. The fluid coupling has been most helpful in absorbing the shock between the motor and mixer transmission when the clutch is thrown from forward to reverse (or vice-versa) at a higher rate of speed. The driver should be told to both bring the clutch into neutral position and idle the motor before reversing the drum. The recent strong trend toward front end power take-offs certainly requires that drivers be carefully briefed on new operating procedures.

To assure long operating life for the drum drive chain, the responsible maintenance employee must be ever alert. He must see to it that the oil drip jar (if this form of lubrication is used) is daily maintained by the driver at full level. Regularly, the chain must be tested for tension and checked for wear. Too tight a chain means trouble. Each manufacturer provides for a certain amount of slack. To save costly replacement expense, a drum drive chain must be properly lubricated and operated at the specified tension. In service procedures, manufacturers' instructions should be carefully followed by the ready mix producer.

## Water System

A familiar caution issued by most mixer manufacturers is to never operate the water pump for any length of time when there is no water in the system.

To prevent engine overheating, both on the truck and mixer, it is advisable to keep the radiator clean, inside and out. If engine is overheated, power is lost, warpage of valves occur, and vapor lock in the carburetor may cause stalling of the motor.

During each "A" service period, a mechanic should check the fan belt and pump belt for proper tension. At each "C" service, the soundness of hose lines and connections should be determined, and any leaks eliminated. Intake hoses should be carefully examined for deterioration and steps taken to make certain that the water system will produce the proper quantities of water with the desired pressure. A loose fan belt will cause low pressure and reduce volume. If indicated, adjustment of the fan belt should get prompt attention.

All the leading mixers have either syphon or gravity tanks which are as accurate for measuring as they can be made. It is generally believed that the syphon type is more dependable in operation. The gravity tank is sometimes less dependable because of sticking in the metering device.

To avoid impairing the quality of the concrete, water valves should be closely checked for leaking. Drivers should be encouraged to read water gages when leaving the plant and again upon arrival at the job. During each "A" service, maintenance men should check for hose rot, for wear, and corrosion on the tanks and connections.

During freezing weather, the water system should be completely drained at the end of each day to avoid any damage to the pump and lines. Before the start of the next day's operation, care must be taken that petcocks are closed, hose couplings reconnected, and water system valves placed in closed position.

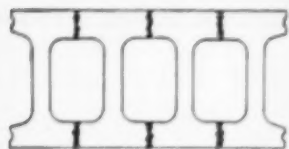
## Hopper and Chutes

In the article on lubrication (see *ROCK PRODUCTS*, March, 1955) we completely discussed necessary lubrication and care that should be given to charging hoppers and door seals. Especially on door seals, daily care is most important. The drivers' chores are greatly increased when a producer

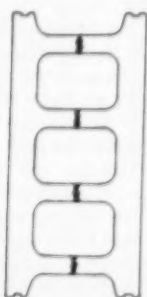
(Continued on page 287)

\*Prem., Nicholson Concrete Co., Toledo, Ohio

## Evolution of the PERFECT BLOCK



**1924** — Besser introduced the Plain Pallet Stripper Tamper. Core plate marks were visible on the top face of each block.

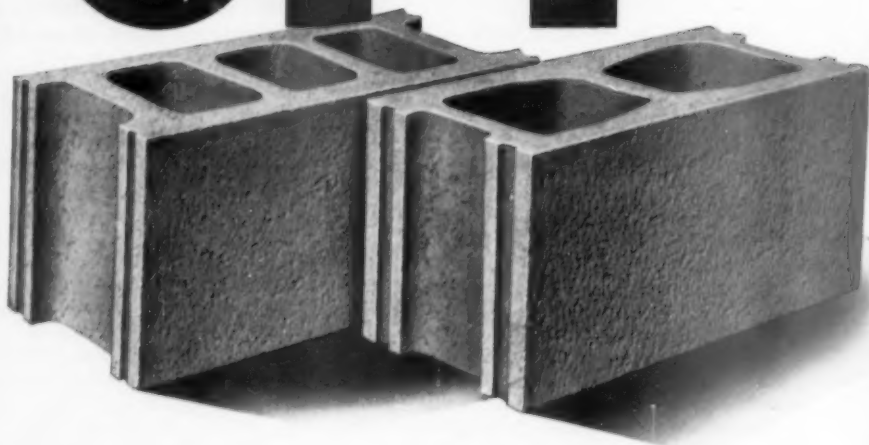


**1936** — Besser turned the block around, thereby moving the core plate marks to the center of the web. This was a great improvement.



**1955** — Besser swung the stripper shoes **UNDER** the core plates, thereby eliminating **ALL** core plate marks on the block.

# UPT



## *Now!* Besser Gives You **UPT**— a Block with **100% PRESSED TOP**

The Besser policy of continuous improvement is again illustrated in the block with Uni-Pressed Top. This revolutionary new feature incorporates swinging stripper shoes which create a 100% PRESSED TOP. All six sides of the block now have improved texture.

How is this accomplished? Very easily and very effectively. The stripper shoes swing under the raised core plates to form a direct contact with the other stripper shoes. In effect, each pair of shoes becomes ONE and presses the entire area of block surface. The higher division plates perfect edges and corners by pressing more material at these points.

**FLOOR AND ROOF PLANK** — The UPT feature is ideal for producing floor and roof plank because grinding of contacting surfaces is reduced to a minimum.

**SOFFIT BLOCK** — The UPT feature eliminates the core plate marks. Saves labor previously spent in preparing block for use. Greatly improves appearance of exposed ceilings.

**PLAIN END OR CORNER BLOCK** — With UPT, the core plate mark is now completely eliminated on the end of block. Perfects corners of buildings and ends of walls.

*Investigate UPT for your plant. Get facts from your Besser representative, or write:*



**BESSER VIBRAPAC** — the fully automatic concrete block machine. Produces high quality masonry units, of any desired texture and density, at the lowest possible cost.

A 8814-1PBC

# BESSER COMPANY

*World's Leading Manufacturer of Concrete Block Machinery*

**ALPENA, MICHIGAN, U.S.A.**



## MIXER MAINTENANCE

(Continued from page 287)

insists upon carrying and mixing 7 cu. yd. loads in a 5½ cu. yd. unit equipped with a sealed end loader. Overloading, fast starting, sudden stopping, carelessness in unloading, and lack of proper daily care all add up to sharp increases in maintenance and replacement expense.

While the care of the charging hopper, door seals, discharge spout and chutes is primarily the responsibility of individual drivers, maintenance personnel, through periodic checking and close supervision of drivers' work, should be held accountable for the operating condition of this equipment.

Regularly, the responsible maintenance employee should check to see that hoppers are in good shape, door seals function efficiently, chute support greased daily, chutes kept clean, the lips of connecting chutes kept free of grout and protected against bad job practices, chutes properly carried in transit, and the possibility of a swinging chute doing damage to passing cars is entirely eliminated.

Field men who are servicing jobs should make certain that chutes are securely tightened down when trucks arrive on job, drivers handle their own chutes on construction work (dependence on job men is a poor risk), added chutes are adequately supported, chutes are cleaned up after discharging each load, extra chutes are not left on a job, and that all chutes are hooked securely in place when trucks leave for the plant.

The chain or other device which supports the chute during unloading operations should not be depended on to support the chute when the truck is in transit. A foolproof hook arrangement should be used that will make certain chutes will not swing or fall off.

At each "A" servicing, the greaser or some other designated employee should carefully check all chute equipment. The discharge spout should be closely inspected so there is no possibility of grout escaping between the spout and the drum. Any opening allowing seepage should be closed with an application of caulking material. New liners should be placed over any worn spouts or chutes. A check should be made that all connecting chutes fit snugly together. Presence of any grout build-up on chute lips should be brought to the driver's attention. Any necessary repairs to chutes, lips, or hooks should be promptly made by the shop.

On each truck mixer fleet of ten or more units, there should be carried

The machine that  
"mechanized" a  
septic tank business!



## 19 BANTAMS help build million-dollar business!

That's the success story of M. S. Eisenhart, York, Pennsylvania. In business only 8 years, his big expansion started 5 years ago with one BANTAM replacing slower, costlier digging and installing methods. Since then he's added a fleet of 19 BANTAM back hoes, both carrier and crawler mounted, for his busy schedule of trenching and excavating operations in a 5-state area. He reports: "My operators claim that they are the finest ¾-yd. machines when it comes to speed, ease and operation."

### BANTAM Method Cuts Digging and Handling Costs


BANTAM makes quick work of all digging and handling jobs with its fast cycle . . . makes the work easy for the operator with simplified mechanical controls. Nine easy-change BANTAM-built attachments equip you for high-speed handling of any job you have.

Helping keep profits higher is a BANTAM specialty — requiring far less maintenance, BANTAM spends more time working and earning. It's true in this case and with all the thousands of BANTAMS in digging, handling and yard work everywhere!

Get all the money-saving facts on the ¾-yd., 6- and 7-ton BANTAM. Mail the handy coupon.

World's Largest Producer of Truck Cranes and Excavators





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Please send me full information on the BANTAM:  
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with ☐ back hoe    ☐ backfiller    ☐ shovel    ☐ clam  
☐ crane    ☐ pile driver    ☐ drag.

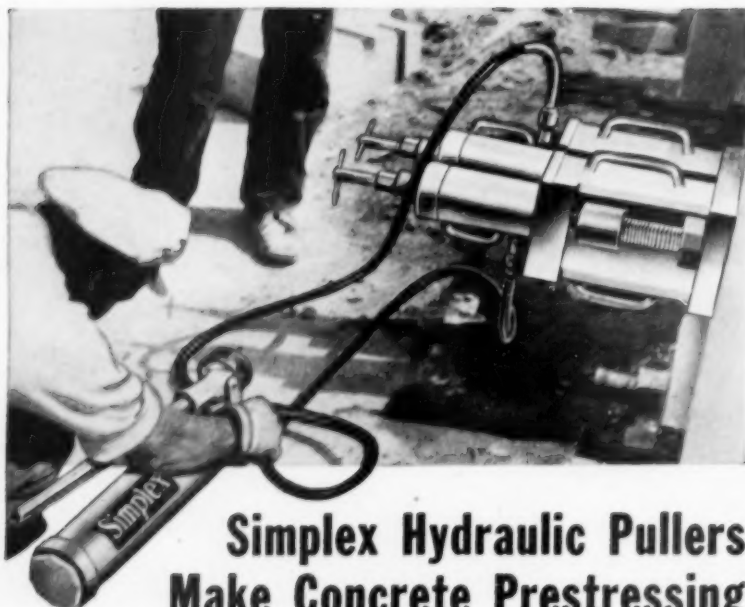
Name..... Title.....  
Company.....  
Address.....  
City..... State.....

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CONCRETE PRODUCTS, August, 1956  
A Section of ROCK PRODUCTS

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289



## Simplex Hydraulic Pullers Make Concrete Prestressing A Real Profit Opportunity for You!

*Standard Units Available from 10 to 100 Ton Capacity*

Prestressing concrete structural units becomes a quick, easy task with Simplex hydraulic equipment. Thanks to the "center-hole" pulling feature of Simplex units; wires, rods and cables can be tensioned without torque, "off-center" pressures or complicated back-up devices. Eliminating these factors accounts for a 75% increase in ease and efficiency.

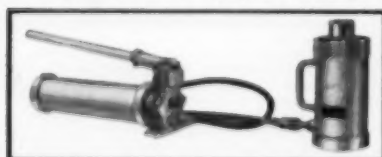
Simplex "Re-Mo-Trol" units consist of a "center-hole" pulling hydraulic ram connected by high pressure hose to a hand, air, electric or gasoline operated hydraulic pump. This powerful combination permits uniform stressing with maximum operator safety and speed. Once the ram is in place, the pump can be actuated from any nearby convenient location.

"Re-Mo-Trol" hydraulic pullers are ideally suited for prestressing

operations. Whether you operate full-time permanent pre-tensioning beds or have only an occasional call for stressed structural units, Simplex offers a model for your express needs. These versatile Simplex units are available in standard capacities from 10 to 100 tons, and can be used directly on cables, rods or wires for heavy tonnage high-pressure tensioning or for pushing or pulling against a holding bracket in multiple bed stressing operations.

The standard Simplex units provide a range of capacities sufficient for most applications. However, custom-built units are available up to 600 ton capacity.

For detailed data on the selection and application of "Re-Mo-Trol" Pullers for prestressing concrete and other construction jobs, write for your copy of our new bulletin: "Hydraulic 56".



**SIMPLEX "RE-MO-TROL"**—Remote-Controlled Unit has ram connected to hydraulic pump by high pressure hose for safe, convenient use in tight spots and dangerous locations. A pressure gauge may be installed for checking tensioning pressure.

Enter 1080 on Reader Card

**SIMPLEX "JENNY"** is a hydraulically operated center-hole puller which also serves as a press or heavy duty jack. It is a self-contained unit available in capacities from 30 to 100 tons.



**TEMPLETON, KENLY & CO.**

2563 Gardner Road • Broadview, Illinois

in stock two complete chutes, including both chute support frames and extension chutes. Periodically, management is advised that a mixer truck that didn't have extra chutes was sent to a job that required a long chute to discharge the load in place. The use of a concrete bucket in discharging loads may lead to damage of the chute support. The use of inadequate chute facilities is a sure way to antagonize a good customer. Yet, in many ready-mixed concrete operations, the hooking up of grout-covered, bent chutes, with connecting parts missing, allows considerable grout to escape between the poor fitting chute sections.

An efficient producer makes certain that drivers and garage personnel combine their efforts to provide on each truck, hoppers, doors, spouts, and chutes that are in proper operating condition.

### General

The whole problem of replacement parts inventory should be based on size of fleet, condition of equipment, age of units and severity of use, with sufficient parts kept on hand to keep the mixer trucks rolling with a minimum of down time. Some producers lose a good many dollars because parts on hand are not properly tagged or otherwise identifiable. Other operators permit carelessness in ordering parts or in failing to return parts that cannot be used. Every producer should insist upon strict adherence to carefully prepared instructions in ordering parts.

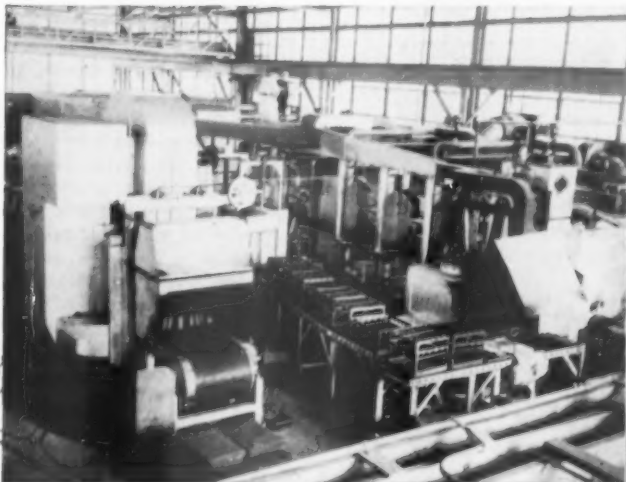
In ordering parts for mixers, the size and serial number of the mixer should be listed. If engine parts are involved, the make and serial number of the engine should be given. The order should set forth for each part the reference number in the parts manual, description of the part, and number of parts required. The order should list complete shipping instructions, including destination and means of shipment (e.g., by air express, motor freight, or parcel post).

All leading manufacturers make available instruction manuals and parts catalogs. Manuals generally show enlarged views of all principal mixer parts, thus assisting mechanics both in ordering replacement parts and in re-assembling torn down mixers.

When parts are received, they should be immediately checked against the packing list. Any claims for missing or damaged parts should be promptly filed with the transportation agency that delivered the parts. If wrong parts have been received, prompt contact should be made with the mixer manufacturer. A letter to the manufacturer should refer to the original order and to the manufacturer's order number

# Million Dollar Heat Treat Department

## *Insures* QUALITY CONTROL!



Interior view of the million dollar Besser Heat Treat Department.

Car furnace showing car loaded with parts before entering furnace.



The Besser Company's facilities for precision manufacture of Vibrapac machines and parts is further evidenced by the \$1,000,000.00 heat treat department. More than 8000 square feet of the spacious Besser plant is devoted exclusively to heat-treating.

Special steel is selected for each machine or mold part. Then, based on its application, it is heat-treated to insure maximum hardness against abrasive wear, as well as toughness to resist shock and vibration.

**Tip to Block Makers** — You can save money by buying Besser Standard Division Plates because they are made of special alloy steel, heat-treated to a Rockwell "C" hardness of 63/65 and a case depth of 5/64" per side — then tempered to guarantee uniformity of hardness and finally 100% inspected.

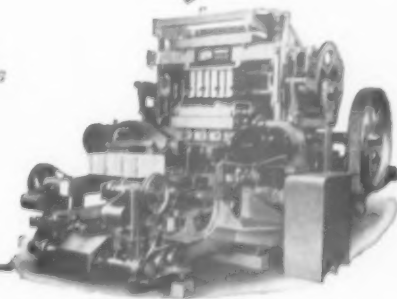
### **BESSER Company**

BOX 135, ALPENA, MICHIGAN, U.S.A.

*Complete Equipment for Concrete Block Plants*



GENUINE VIBRAPAC PARTS  
ARE MADE ONLY BY BESSER



CONCRETE PRODUCTS, August, 1956  
A Section of ROCK PRODUCTS

A 8898-1PC  
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# Faster Unloading with the National Car Shaker



**FASTER, SAFER, LOWER-COST UNLOADING** with the *low cost* National Car Shaker. Unloads a car in as little as six minutes with no man required in or under the car, under normal conditions. Unloads coal, coke, cinders, sand, stone, aggregates and all bulk materials.

Used and time-tested by hundreds of firms, both large and small. The time saved by Consumers Company, (see letter below) is typical.

**Consumers Company**

79 WEST MONROE STREET Chicago 3, Illinois

Telephone 2-1111  
BUILDING MATERIALS - READY MIXED  
CONCRETE - SAND - GRAVEL - CRUSHED STONE

July 8, 1953

National Conveyor & Supply Co.,  
350 North Harding Avenue,  
Chicago, Illinois.

Gentlemen:

I am taking this means of expressing our pleasure in the efficiency of your car shaker. We have four National Car Shakers at our various yards and all are being used to unload sand from hopper cars.

The sand is received containing various amounts of moisture and prior to the use of your car shaker the sand was pushed down by hand, thus not only adding to the expense of unloading cars but also curtailing the amount of sand we were able to unload to a point below that which was required in our operations. We now unload even wet sand with sufficient speed to keep our plants running.

The shakers have been comparatively trouble free and on the few occasions when they needed service we found your company very cooperative in expediting the repairs.

Yours very truly,  
CONSUMERS COMPANY

Robert J. Hummel,  
Vice President.

WRITE TODAY for  
information on how the  
National Car Shaker  
can save money, time  
and labor for you.

**National Conveyor & Supply Company**

356 N. HARDING AVENUE  
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CHICAGO 24, ILLINOIS

## WHAT ARE YOU PAYING FOR REPAIRS?

The money you are paying to keep worn-out equipment working may be just enough for you to own better equipment.

See the "WHERE TO BUY" Section

covering the shipment. You should briefly describe the parts, giving reference number, list the number of parts involved, and give reasons for returning.

The package containing any parts that are being returned should include a paper that identifies the parts and connects them to the original shipment. The package should be consigned to the correct address of the manufacturer and a copy of the bill of lading should be forwarded to the attention of the service department.

Maintenance is a number one problem of our industry. The success or failure of an individual operator may be dependent on the kind of equipment he buys, the operating care it gets, and the efficiency of a carefully planned preventive maintenance program. In my opinion, a producer is on his way when he makes up his mind that he is going to have the finest appearing, best operating equipment in town. Without increasing operating or maintenance costs, an efficient producer can reach that goal.

### New York Masonry Design Contest

THE NEW YORK STATE CONCRETE MASONRY ASSOCIATION and New York State Association of Architects, in cooperation with the Portland Cement Association, recently sponsored a Concrete Masonry Home Competition for architects, draftsmen and students of architecture who are registered, employed, or studying in New York State.

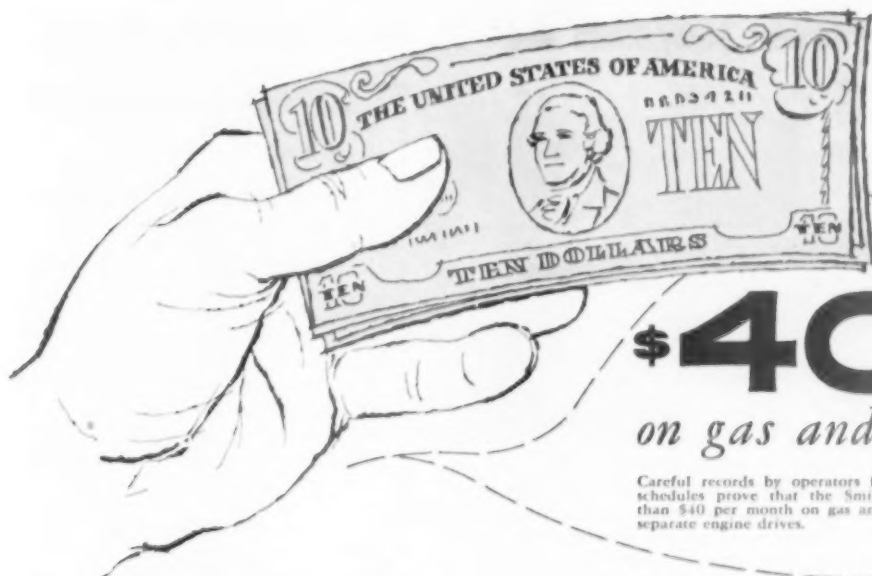
Two options were designated; a two-bedroom home up to 1100 sq. ft. with a one-car garage, or a three-bedroom home with up to 1200 sq. ft. and a one-car garage. Prizes offered by the masonry association were: \$1000 first prize; \$750 second prize; \$500 third prize; and ten awards of \$100 each for honorable mentions.

### Unusual Dry-mix Package

BOX MIX CORP., Norfolk, Va., has applied for a patent on a special container to be used for packaging and later mixing of dry-mix materials. C. B. Drake, president, has opened what he believes to be the first plant to manufacture and package dry ingredients in such a container.

Dry concrete, plaster, masonry paints and related products will be available in 30, 60 and 90 lb. sizes. The ingredients will be boxed and later mixed in a heavy, fibre-board, paraffined container. The high early strength cement will be enclosed in a moisture-proof plastic bag to prevent hardening.





save  
**\$40** per month  
 on gas and oil alone

Careful records by operators for a full year of tough schedules prove that the Smith Integral\* saves more than \$40 per month on gas and oil alone compared to separate engine drives.

**It's the "engine loafing" that hikes maintenance costs**

With a separate engine drive, high maintenance results from *loafing* the truck mixer engine—not from working it to death.

**The Integral NEVER LOAFs**

In the Integral, the truck engine always operates at efficient speeds. Carbon buildup is eliminated.

There is plenty of horsepower from the truck engine alone because *the only times extra power is needed, the truck is standing still.* This is for charging and discharging. Full horsepower from the truck engine is thus available for both operations. Once the drum starts revolving, only about 5 to 10% HP is taken from the engine.

If you don't need two engines, why pay for two? *One* is actually more efficient.

Write for full details about the cost-saving Integral.

*Since 1900, the pioneer designer and foremost manufacturer of the world's finest mixers.*

**SMITH**  
**integral\***  
ONE FRAME FOR BOTH TRUCK AND MIXER    ONE ENGINE FOR BOTH

\*TRADE MARK



**THE T. L. SMITH COMPANY, Milwaukee 45, Wisconsin; Lufkin, Texas**

Affiliated with Essick Manufacturing Company, Los Angeles, Calif.

Ad No. A8784-1P  
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CONCRETE PRODUCTS, August, 1956  
 A Section of ROCK PRODUCTS

293

"Cleaned with a whisk broom, putty knife and . . .

## EDI-COTE 103 in half the time!"

says owner\*  
of this 17 year  
old mixer that  
looks like  
new.



EDI-COTE #103 is a revolutionary new release agent that prevents concrete from bonding to mixer blades and parts. EDI-COTE #103 eliminates the use of air guns and sledge hammers in the daily clean-up. EDI-COTE #103 creates a non-hardening film which prevents the forming of a bond between concrete and metal. It adheres rigidly and will not dissipate due to chemical action or abrasion. One application of EDI-COTE #103 will remain effective throughout the longest working day. EDI-COTE #103 can be applied with brush or spray. Shipped in 55 gallon drums. 5 gallon cans available for trial shipments only. Order EDI-COTE # 103 today!

\* Frank Erdman & Son,  
Milwaukee, Wisconsin

**Edick**  
**LABORATORIES**  
427 West National Avenue  
MILWAUKEE 4, WISCONSIN

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For further information on  
EDI-COTE #103, see your  
NCMA Technical Bulletin  
No. 2, Attachment No. 1,  
March 3, 1955.

## MOISTURE CONTROL PROBLEM?

BUT MOISTURE CONTROL IS SIMPLE!

It does it . . .

*Automatically*  
**INSTANTLY  
ECONOMICALLY  
ACCURATELY**

Low initial cost. Unconditionally guaranteed. You must be completely satisfied. Installed, tested, calibrated, and adjusted by our engineers in your plant, on your material. Delivery anywhere in the United States within three weeks of receipt of order. Price—\$669.00.

FOR IMMEDIATE ATTENTION,  
NO OBLIGATION

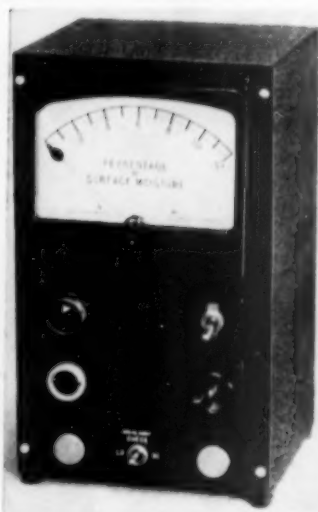
WRITE . . .

**C & W SALES CO., INC.**

1490 Franks Lane

Menlo Park, California

Member N R M C A



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## OHIO READY MIX MEETING

(Continued from page 274)

21 active and three associate members were added to bring total membership to 143 active, 35 associate.

Passage of a 1000-lb. weight tolerance bill, in part attributable to the efforts of the association, was one of the activities that kept the office of secretary Claude Clark busy. Mr. Clark strongly warned against operators treating the new bill as an additional weight allowance. He said that it was designed to allow for differential weight distribution and that abuse would mean its repeal.

An 11¢ increase in the Industrial Insurance rate to \$1.57 per \$100 of payroll for ready-mixed concrete producers should warn operators to promote safety among their employees. Safety also received a boost from Mr. Clark as having a "tremendous public relations appeal", for it serves to advertise the industry with a genuine appeal for improved working conditions and maintenance of equipment.

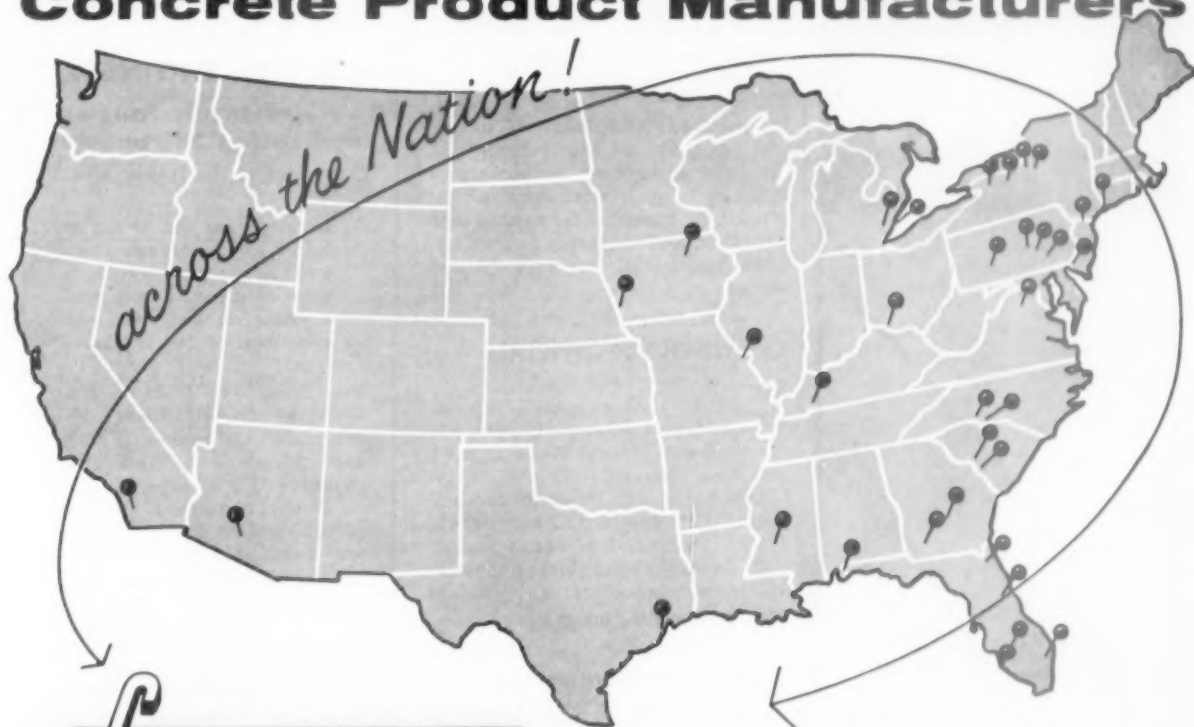
Selection and maintenance of ready-mixed concrete vehicles was covered by W. J. Core, assistant director of service, Mack Manufacturing Co. He suggested that the mixer be chosen first. Then, with the help of a salesman, a satisfactory chassis can be purchased. Recent mechanical developments were covered by Mr. Core, who felt that automatic transmissions and air suspension systems would need much more development before they would be applied in ready mix trucks.

Scheduled lubrication is vital in vehicle maintenance. Mr. Core likened old grease in exposed parts to a lapping compound, and urged that enough grease be applied to push the old grease out. If monthly and semi-annual inspections are included in a maintenance program, overall vehicle expenses will be one half of what they would be under a breakdown system.

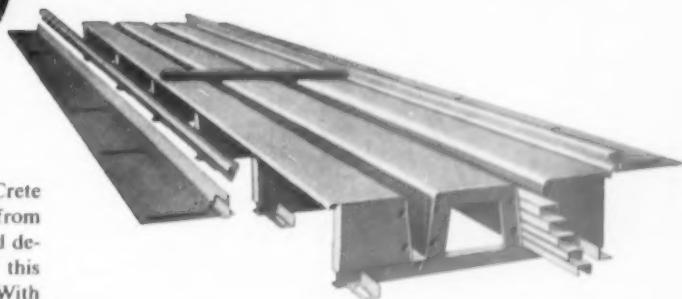
Mathematical calculations involved in the selection of a truck chassis for a concrete mixer were shown in a black-board lecture by F. S. Baster, vice president White Motor Co.

Safe driving is "paying off" in financial awards at Hamilton Sand and Gravel Co. Roger Slugg told of his company's plan under which an employee may earn an extra \$10 per quarter and participate in a large annual company pool simply by not having an accident during the quarter. The tangible benefits to the company include decreased down-time, reduced claims, and fewer repair bills. The program has built good will, improved

# The choice of Prestressed Concrete Product Manufacturers



## STEEL FORMS



The immediate acceptance and purchase of Form-Crete Steel Forms by prestressed concrete manufacturers from coast to coast provides ample assurance of the sound design, practical rugged construction and economy of this new innovation in the prestressed concrete field. With the addition of a line of I-beam forms engineered for casting all standard specified sizes of prestressed concrete I-beams we offer the most complete line of coordinated interchangeable forms and accessories obtainable anywhere. A new revised catalog is available soon — write for your copy today.



**FORM-CRETE DOUBLE-T ALL-STEEL CASTING FORMS**—By utilizing a variety of girders and stem heights an ingenious manufacturer can easily surpass the 37 individual prestressed concrete castings that we conservatively estimate may be produced from this one all-steel form assembly.

SEND FOR **FORM-CRETE BULLETIN 100-A**



**FOOD MACHINERY  
AND CHEMICAL CORPORATION  
FLORIDA DIVISION**  
LAKELAND, FLORIDA

FORM-CRETE STEEL FORMS FOR CASTING REINFORCED OR PRESTRESSED CONCRETE



DOUBLE "T" SLABS



SINGLE "T" JOISTS



HOLLOW AND  
SOLID LINTELS



SQUARE AND  
OCTAGONAL PILING



BRIDGE BEAMS



PAN TYPE  
BRIDGE DECKS

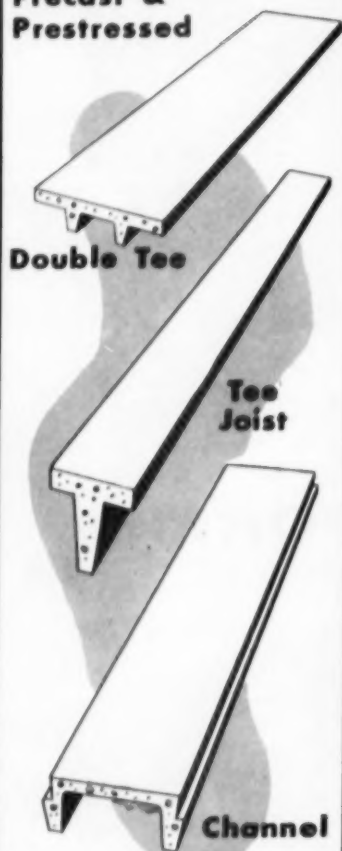
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CONCRETE PRODUCTS, August, 1956  
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For the BEST in  
concrete construction

# USE LEAP CONCRETE

Precast &  
Prestressed



LEAP concrete products are mass produced in long spans to standardized designs in 25 plants throughout the United States, Canada, Hawaii and South America.

Franchises available in some localities—write for complete details.  
See our listing in Sweet's Architectural file.

LEAP CONCRETE  
P.O. Box 1053, Lakeland, Florida Dept. H-14  
Please send me complete details about LEAP Prestressed Concrete.

NAME .....

ADDRESS .....

CITY .....

STATE .....

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employee morale, stimulated driver courtesy, and put management on its toes to promote safety.

C. O. Dittrich, in his last official action as president, presented certificates of recognition to the 15 living past presidents.

George Frye, incoming president, praised the accomplishments of the previous year and briefly mentioned his desire to increase the number of active and associate members and expressed the hope that the coming year would see the Ohio Ready Mixed Concrete Association grow in scope and service.

## CROWE-GULDE OFFICIALS

(Continued from page 284)

Chris F. Lutz is general superintendent, Tom J. Whitacre is ready mix foreman and Elwood Hicks is block and stone foreman.

Officers of the Hereford corporation are C. T. Crowe, president; John F. Gulde, vice-president and treasurer; and Stanley Crowe and Joseph F. Gulde, vice-presidents. Ray Godwin manages the Hereford plant.

## Technical Publications

NATIONAL READY MIXED CONCRETE ASSOCIATION, Washington, D. C., has available the following publications:

"Proposed Recommended Practice for Winter Concreting" (No. 58), reprint of a paper prepared by the American Concrete Institute.

"Design and Control of Air Entraining Concrete" (No. 60), which replaces earlier publication No. 21.

"Test Hammer Provides New Method of Evaluating Hardened Concrete" (No. 61), a comprehensive paper on rebound test hammer method of concrete strength determination.

"Evaluation of Compression Test Results of Field Concrete" (No. 62), on expected variations in concrete strength.

"Admixture for Ready-Mixed Concrete", a general discussion of concrete admixtures.

## Acquires Four Companies

STANDARD PAVING AND MATERIALS LTD., Toronto, Ont., Canada, has announced the acquisition of the following four companies: E. V. Breckon, Ltd.; Mixed Concrete Supply, Ltd.; Red D-Mix Concrete (Hamilton) Ltd.; and Mixed Asphalt and Contractors Supplies, Ltd. The acquisition includes ready-mixed concrete plants located in Hamilton, Chippawa, Welland, St. Thomas, London, Brantford and Guelph, as well as a mixed asphaltic materials plant at Hamilton.

# COMMENT

from the

## BUTLER ENGINEER

... of traffic tangles  
and racing 34E pavers

Overheard at the Ready Mixed Show:

"So you want me to cut my price? Look, this equipment will pay you a profit for years to come. I only make a profit on one sale—and you want to cut me out of that!"

The other day I drove from Waukesha to Milwaukee. Had to slam on my brakes to dodge a truckload of concrete block swinging out of a block plant (a Butler customer). In back of me (and he hit his brakes) was a transit-mix truck from a Waukesha ready mix outfit (another Butler customer). After I swallowed my heart I started to pass the block truck but had to swing back to avoid a transit-mix truck from Company Y in Milwaukee (another Butler customer). All right, don't believe this: booming along in back of Y's truck was another transit-mix owned by Z (another B-c.). Kind of a concrete traffic problem!

With the Butler 0-1-0 one-man-operated Roadbuilders' Plant I rather thought we had reached a pretty ultimate high for production. Now comes the idea of adding an aggregate bin for one size of stone (pre-set controls and automatically batched of course). Such a set-up would play ring-around-a-rosy with THREE 34E dual drum pavers.

Butler Automatic Batching (roadbuilders, ready mix or concrete products) will not do certain things. It won't mix baby's formula wash the dishes polish your car but it will make you such a happy, handsome profit you can hire those jobs done.

Stay healthy, wealthy and you won't need to be wise

*The Butler Engineer*

BUTLER BIN COMPANY  
WAUKESHA, WISCONSIN

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## Cellular Concrete Maker

COLORADO DUROX CO., Denver, Colo., will build and operate a half million dollar plant in Littleton, Colo., under franchise from a Swedish firm. Karl Lagnefors, president, began forming the company last fall.

Durox is a cellular lightweight concrete developed in Sweden in the early 1920's. The makers claim it is cheap and easy to transport, its light weight making possible the manufacture of large-size block. It may be drilled, sawed and nailed with ordinary tools. Insulation qualities are good, according to the manufacturer.

## Industrial Radio Standards

THE NATIONAL SAND AND GRAVEL ASSOCIATION and the National Ready Mixed Concrete Association have published "Eligibility Standards for Use of Industrial Radio," by Ernest W. Jennes, counsel for the associations. The 27-page booklet includes the panel discussion on the use of industrial radio in sand and gravel and ready-mixed concrete operations, which was presented at the annual conventions at Chicago, Ill., in February, 1956. The publication is available from the associations' office at Munsey Building, Washington 4, D. C.

## Opens Ready-Mix Plant

PORTER LUMBER CO., Morenci, Mich., has opened a ready-mixed concrete plant at Morenci. Plant facilities include 525-bbl. cement storage capacity; drive-over aggregate bins to facilitate unloading, with a capacity of 15 tons of crushed stone and 15 tons of sand; and an automatic water metering system. Two transit mixer trucks, with capacities of 4½-cu. yd. and 3½-cu. yd., service the areas of Fayette, Hudson and Morenci, Mich.

## Pavement Yardage

AWARDS OF CONCRETE PAVEMENT for the month of June, 1956, were listed by the Portland Cement Association as follows:

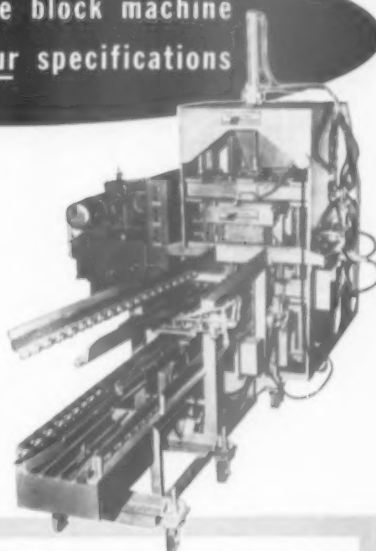
	Sq. Yd. Awarded During June, 1956
Roads .....	4,149,379
Streets and alleys .....	2,809,551
Airports .....	720,041
Total .....	7,678,971

## Form Ohio Valley Group

OHIO VALLEY BLOCK MANUFACTURERS ASSOCIATION, Portsmouth, Ohio, has recently been organized. Harold Whitlach, Scioto Building Unit, was host at the first of the monthly meetings.

**here is the single block machine  
built according to your specifications**

Here is a block machine — the Fleming Model "10" single down stripper — that really makes sense. It has been designed, built, tested and proved by engineers who have made their living by producing concrete block. The Fleming Model "10" is equipped with advanced features formerly found only in far more expensive machines. Yet its cost is surprisingly low.



**these features are YOURS with the Model "10"**

- Front Pallet Feeder and Ejector
- Electronic Height Control
- Smooth-Flowing, Rugged, All-Welded Construction
- Vibrator, Removed from Machine, is Mounted on Reinforced Concrete Slab
- Long Life, Minimum Maintenance, Guaranteed to Produce Highest Quality Block
- Factory Tested at 240 Cycles an Hour.

**FLEMING**

**MAIL  
TODAY!**

Gentlemen: Please rush complete information, including specifications, prices and terms on the following:

- ☐ FMC 10    ☐ FMC-180  
☐ FMC 20    ☐ FMC Block Splitter  
☐ FMC 25    ☐ FMC Stationary Mixers

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ ZONE \_\_\_\_\_ STATE \_\_\_\_\_

FLEMING MANUFACTURING COMPANY • 487 Fleming Ave., Cuba, Mo. • Phone: Cuba 400  
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**INFORMATION  
FILE  
HOW TO  
OPERATE  
PROFITABLY**

See  
**ROCK  
PRODUCTS**  
Table of  
Contents Page.

There is  
probably a  
story of  
interest and  
profit to you!

## CONCRETE BURIAL VAULTS

AMERICA'S FINEST MOLDS AND LOWERING DEVICES

TERRITORY FRANCHISES

### BERG VAULT CO.

EQUIPMENT DIVISION  
1620 LUCAS HUNT RD. ST. LOUIS 30, MO.

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**"STANDARD"**  
The World Over



Backed by over 45 years of reliable service, the QUINN Heavy Duty form is recognized as the STANDARD design and the finest concrete pipe form everywhere. Used in making pipe by vibration, spading or tamping. Sizes for pipe from 16" to 120" and larger. Tongue and groove (as shown) or bell end pipe in any length desired. If your pipe orders specify extra large sizes, odd shapes or unusual lengths, there's a Quinn form made to produce the finest pipe at lowest possible cost.

Also Manufacturers of  
**QUINN CONCRETE PIPE MACHINES**



## Free CATALOG

Illustrates our complete line of equipment. Contains pages of valuable tips for the concrete pipe manufacturer. Write today for your free copy and estimates.

**Quinn WIRE & IRON WORKS**  
BOONE, IOWA

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## Panel Manufacturer Enlarges

BADGER CONCRETE Co., Oshkosh, Wisc., manufacturer of concrete products, soon will open a new plant devoted to production of Mo-Sai sandwich panels, cast stone and roof slabs. A number of large contracts for production of various products has recently been awarded to the company by such large firms as Universal Atlas Cement Co., Marquette Cement Co., and Evinrude Co.

## Buys Concrete Company

HOUDAILLE INDUSTRIES, INC., Buffalo, N. Y., has purchased the Commonwealth Concrete Co., which operates plants in New Jersey and Pennsylvania. Houdaille's president, Ralph F. Peo, announced the acquisition, and stated that the company's present fleet of 98 ready-mixed concrete trucks will be expanded.

## ACI Building Code

THE AMERICAN CONCRETE INSTITUTE has adopted a building code aimed at lowering the cost and streamlining the construction of reinforced concrete buildings. The code permits greater use of reinforced steel, allowing greater flexibility.

## SAVE MONEY! UNUSED

### 6X6 ARMY TRUCKS

International  
& GMC 2 1/2-ton



- From Government Storage!
- Unused and Guaranteed!
- Factory New Condition!
- Reconditioned Trucks also Available!

Save up to \$3,000 on one of our unused Army trucks. See for yourself how TWO of our trucks cost you even LESS than one new truck.

Compare our Tandem Axle Trucks with front wheel drive, 10 forward speeds, overdrive and new mud and snow tires with similar equipment elsewhere.

Investigate now! . . . There's no obligation . . . and we deliver on approval!

For Specifications, Prices, Delivery Write,  
Wire or Phone Collect—Jackson 5-7841  
MILTON Y. TOOMBS, JR.,  
Sales Manager

**MEMPHIS EQUIPMENT CO.**  
766 S. THIRD ST. MEMPHIS, TENN.

CONSTRUCTION AND AUTOMOTIVE  
EQUIPMENT AND PARTS.

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Front view showing  
operator feeding block  
into BES-STONE Block Splitter.

## Make this your **BEST** year with the **BES-STONE** Block Splitter

**Expand Your Opportunities** — Cash in on the Split Block demand. Its "quarried stone" character pleases owners. You'll find it ideal for all structures, large or small . . . commercial, institutional or home construction. BES-STONE challenges the creative ability of both architects and builders.

**BES-STONE Splitters** — Automatic, powerful, hydraulic operation . . . up to 960 Split Block per hour. Straight line cuts . . . No cull block. Easily adjustable for splitting various block heights. Block is placed under knife, automatically. And the finished Split Block is automatically removed from under the splitting knife by the incoming block. Quiet, safe operation.

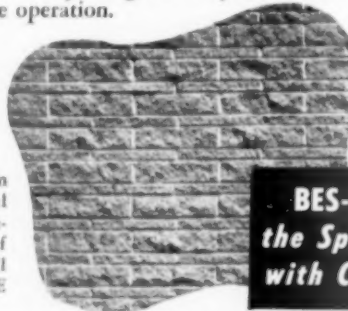
## Fast, Accurate

**Profitable Producer of 960 Split Block  
per Hour!**

### PONY BLOCK TRIMMER

Indispensable tool for on the job. Trims off the end of any block up to 8" by hand operated, hydraulic pump. Capacity 12 tons. Legs easily removable. Compact. Lightweight. Easily portable.

There's big money for you in attractive, permanently colorful BES-STONE Split Block. It complements and increases sales of standard stripper block. Get all the facts. Write for BES-STONE Bulletins 95A and 100.



Note the natural  
beauty of  
BES-STONE.  
No maintenance,  
no painting,  
no peeling off.

**BES-STONE**  
the Split Block  
with Character

**BESSER COMPANY • Complete Equipment for Concrete Block Plants • Alpena, Michigan, U. S. A.**

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A 7908, 1/2 HR2

# BIG VOLUME GRINDING

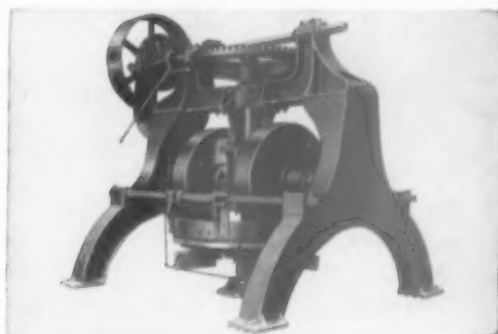
at  
**Low  
Cost**



## Ideal For Aggregate Grinding

- Delivers up to 30 yards per hour.
- Handles material wet or dry.
- Grinds cinders, pumice, haydite, slag and quarry and mine products.
- Adjustable to meet volume and size requirements.
- Requires only minimum maintenance.
- Gives years of trouble-free service.
- Has low power consumption.

Huber-Warco Grinders range in capacity from 4 to 75 yards per hour. Whatever your capacity requirement, there's a Huber-Warco Grinder exactly suited to your type of aggregate. Ask for a non-obligating consultation with the Huber-Warco grinding specialist . . . write, wire or phone.



### HUBER-WARCO NO. 9 GRINDER

This 30 yard per hour capacity grinder has been designed to give big-volume aggregate production with a minimum of grinding costs. The suspended yoke mounted mullers are adjustable to any height, and for finer grinding, the grinding surfaces run together.



## HUBER-WARCO COMPANY

MARION, OHIO, U. S. A.

*Road Machinery*

CABLE ADDRESS: HUBARCO

ROAD ROLLERS • MOTOR GRADERS • MAINTAINERS • GRINDERS

## HERE'S A PORTABLE SMALL PLANT TO CUT LONG HAULS



A CIMCO plant and conveyor batch truck mixers.



CIMCO'S 2 or 3 bin plants move or set up quickly.



CIMCO'S Model CFH-6 concrete floor hopper keeps truck mixers going at top speed all the time.

For complete information, specifications and prices on all CIMCO products, write:

Box 422, Marshalltown, Iowa, U.S.A.

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## Concrete Product for New System of Gardening

CONCRETE PLAN-TILES, designed primarily for patios and patio-garden combinations, are said to be the first completely practical adaptation of the age-old rock mulch theory.

Each planTile is 16 in. square with a hole in the center. The middle of each side is cut in a semi circle and the corners are shaped in quarter circles. When laid snugly together, plan-Tiles form additional holes at the corners and sides, and their weight keeps them firmly in place without the use of mortar.

In the center, side and corner holes, plants, bulbs or seeds are placed (any type that doesn't have excessively large roots). Weeding is eliminated because there is no place for weeds to grow, and the concrete tile encourages earthworms that constantly work and turn the ground keeping the soil around the plants' roots loose and aerated. For all practical purposes, planTiles make cultivating obsolete. When plants are replaced, a few stirs with a trowel within the holes take care of cultivation.

A highwater retention factor is said to reduce evaporation by more than 50 percent. During the day the product absorbs the sun's heat and keeps

the soil cool and moist; at night, when the temperature drops, planTiles generate growth provoking warmth to the garden. The "do-it-yourself" feature is another worthwhile sales factor. First the ground is prepared by turning the soil, adding fertilizer and leveling off the entire area, as with a conventional garden. Next the planTiles are laid snugly together in the desired design, and plant bulbs, seeds and/or plants are inserted. To water the garden, a hose is played over the concrete tiles and the water runs down to the holes and then to the plants. The units retain a reserve of moisture, which would ordinarily be lost to evaporation. To fertilize the garden, fertilizer is sprinkled over the tiles and then watered down with a hose; again the water and fertilizer go to the holes and thus to the plants.

The tiles are said to be practical for the home garden, landscaping commercial buildings and farm production. The planTiles would be produced by concrete products companies throughout the country operating under franchises granted by the Granger Co., Box 1481, Beverly Hills, Calif., for sale through nurseries, garden shops and building materials yards.

## Honor Safe Drivers

ANDERSON CONCRETE CORP., Columbus, Ohio, recently honored 66 accident-free drivers at an annual safe driver award banquet. State, county and city officials presented certificates and cash awards to the winning drivers. Top awards went to Howard Collins and Willie Wilt for eight years of safe driving; Lawrence Crissinger, Francis Millar and Emmitt Timmons for seven years; and George W. Thompson, David Estes, Jasper Wamsley and Dean Colombini for six years. Awards were also presented to eight drivers with five-year records; seven with four; nine drivers with three-year records; 18 with two-year records; and 15 with one.

## Golden Anniversary

FISCHER LIME & CEMENT CO., Memphis, Tenn., is celebrating its 50th anniversary as a building supply firm. The company, which produces more than one million concrete block annually, formed a subsidiary, the Fischer Steel Corp., in 1945, to meet the demand for structural building steel. The company claims to be the largest building materials distributor in the South, with more than 1000 dealers. It was founded by the late W. W. Fischer and his sister and brother-in-law, Mr. and Mrs. W. N. Fry, Sr.



## WEIGHMEISTER Screw-Action Batch Lift

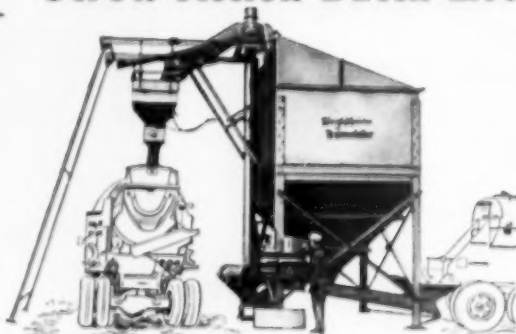
Self-Contained

Portable

Accurate

Automatic  
Operation

Fast



Fast-working screw lift gives Weighmeister its large capacity for handling bulk cement. The precision-fed batcher and automatic electro-pneumatic controls provide dependable, accurate, constantly uniform mixes. One man can operate the Weighmeister with three push buttons . . . and it's completely self-contained! It's equipped with compressor, automatic controls and electric motor or gas engine. All air and electric lines are permanent; no connections to waste time in moving. Can be moved on a single truck. Needs no footings or ramps. Just set Weighmeister on a firm level spot . . . and have it running in a short time. See your distributor or write for details. L. Burmeister Co., 4529 W. Mitchell St., Milwaukee 14, Wis.



COMPLETE PLANTS FROM A SINGLE SOURCE

# Burmeister

L. BURMEISTER CO., 4529 W. MITCHELL ST., MILWAUKEE 14, WISCONSIN

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# JIFFY LIFT



## THE REVOLUTIONARY UNIT FOR LOADING AND UNLOADING BLOCK, BRICK, CEMENT, PRECAST UNITS

Today's solution to mounting delivery costs. Slashes loading and unloading time with less danger of chippage or damage.

Costs only a few pennies a day to operate. Pays for itself in four months or less. Handles 10,000 lbs. with ease and safety. One man operation from either side of truck quickly, safely.

Four wheel drive and four cable suspension eliminates dangerous swinging, saves time. Easily, quickly installed. Sturdily built, minimum of maintenance.

**TWO MODELS, TWO CAPACITIES, TWO OVERHEAD CLEARANCES TO CHOOSE FROM**

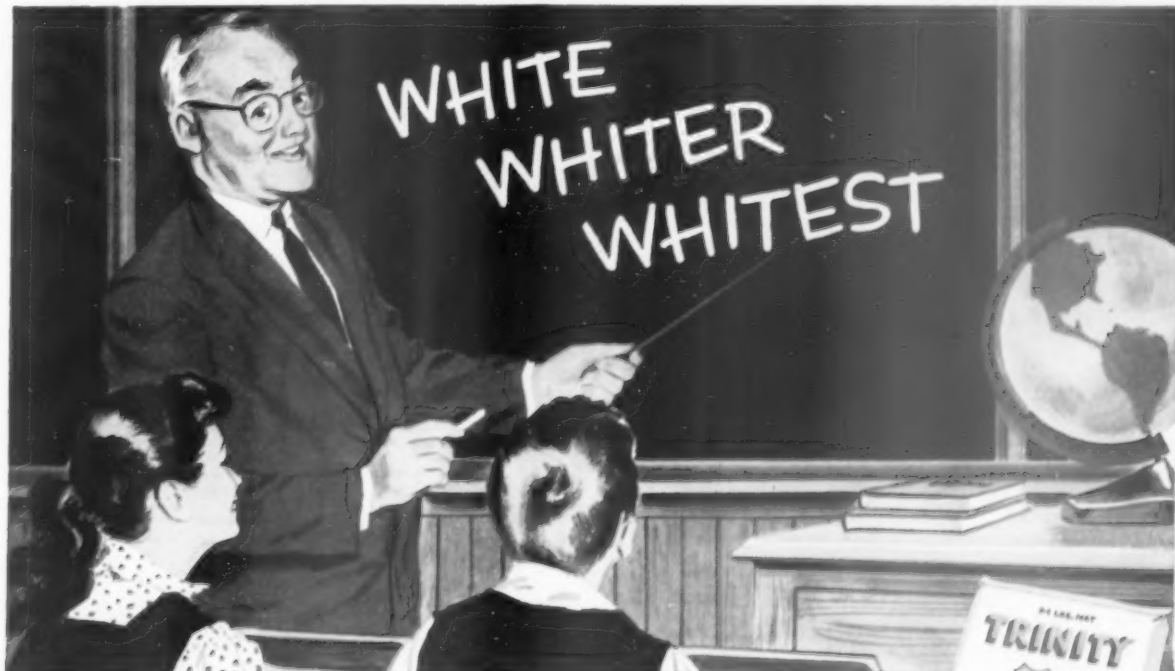
*Write TODAY for Bulletin giving full details about Jiffy Lift.*

**ELBERFELD MANUFACTURING COMPANY, INC.**

ELBERFELD

INDIANA

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## TRINITY WHITE

Whitest in the bag... whitest in the mix... whitest in the completed job. Use Trinity White Cement for architectural concrete units; terrazzo; stucco; light reflection—wherever a whiter white or purer colors are desired.

A Product of GENERAL PORTLAND CEMENT CO. • Chicago • Dallas • Chattanooga • Tampa • Los Angeles

As white as snow  
... plain or waterproofed



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CONCRETE PRODUCTS, August, 1956  
A Section of ROCK PRODUCTS

301

# Concrete Filler Block for *Fire-Safe* FLOORS and ROOFS

Why make only the walls of a new building fire-safe and permanent?

Why not also apply these practical advantages to the floors and roofs? Concrete Filler Block, produced on a Besser Vibrapac, make it possible for the ENTIRE structure to be fire-safe and permanent . . . at LOW COST.



## ALL made on a BESSER VIBRAPAC

Concrete Filler Block are made on a Besser Vibrapac . . . the same dependable machine that produces high quality concrete load bearing block for walls. And the same Plain Pallets are used. All types of filler block can be made in various sizes to coordinate with other modular materials and for all load conditions. Block plant operators can materially add to their profits by supplying their customers with BOTH wall and floor units. For further facts, contact your nearby Besser representative, or write:



Vibrapacs are versatile. They make ALL types and sizes of block on ONE set of Plain Pallets. Fully automatic. Off-bearer removes finished block with power hoist. No manual lifting.

**BESSER COMPANY • Complete Equipment for Concrete Block Plants • Alpena, Michigan, U. S. A.**

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"Progressive Meekins, Inc. of Florida now have 2 Side-O-Matics in their fleet"



"Meekins, Inc. are both quality- and service-minded"

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Bridgeport, Connecticut—3 units

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Cleveland, Ohio

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East Petersburg, Pa.—2 units

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Jacksonville, Florida

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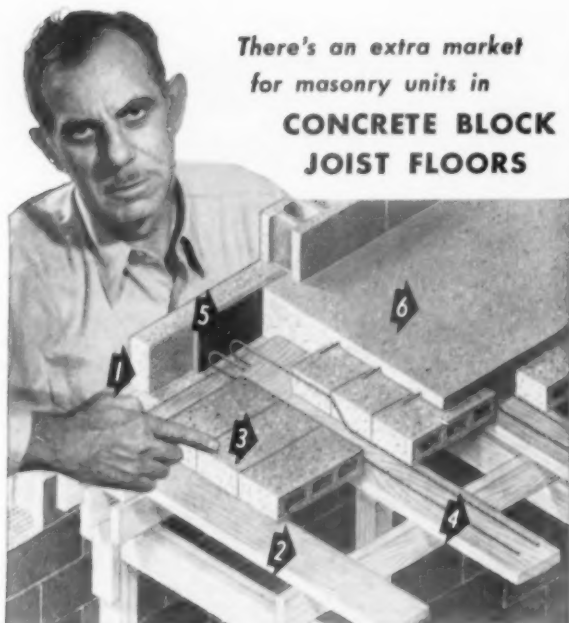
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P. O. Box 1561, York, Pa. • Phone York 7357

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*There's an extra market  
for masonry units in*  
**CONCRETE BLOCK  
JOIST FLOORS**

The popularity of concrete block joist floors for buildings with light floor loads is rapidly increasing. Such floors are easy to build. They also are sturdy, durable, economical and firesafe.

One of the best ways to develop this "extra" market is to promote sound construction practices. You'll find it's good business to make frequent calls at job sites—encouraging builders to follow these simple steps:

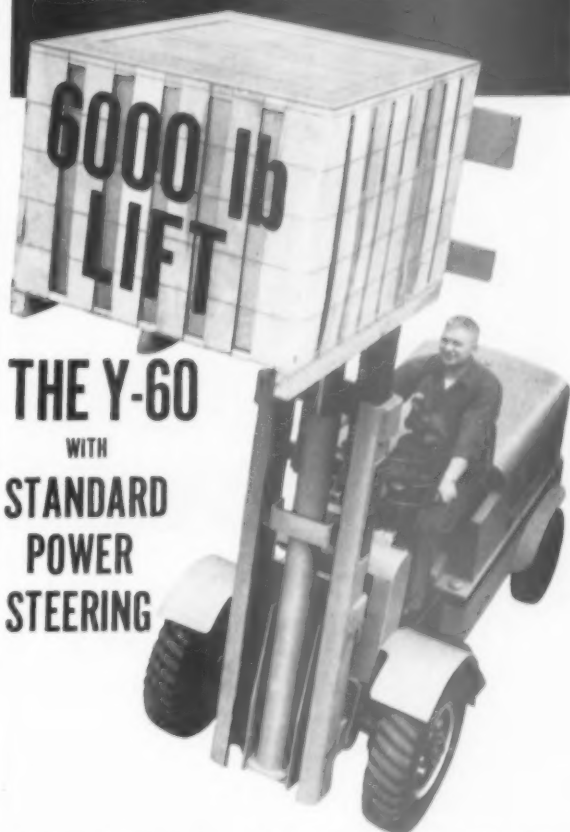
- 1** Build exterior wall to the height of a floor, including one course of 4" solid concrete block.
- 2** Erect formwork of parallel planks for supporting filler units and concrete slab.
- 3** Lay rows of block on planks, with cores running horizontally. Joints between block in adjacent rows may be staggered or continuous.
- 4** Install reinforcing bars for cast-in-place joists as per design table.\* Place conduits for wires, ventilating, plumbing and heating.
- 5** Set a continuous strip of 1" waterproof insulation board—as deep as the floor is to be—around the outside edge of the floor.
- 6** Place concrete for joists and slab and moist cure 5 to 7 days. The floor is an ideal base for any finish desired. The flat underside can be painted, plastered or left exposed as desired.

\*Write for helpful free booklet on design and construction of concrete block joist floors. Sent only in United States and Canada.

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• 6 cylinder—73 h.p. Industrial Engine.  
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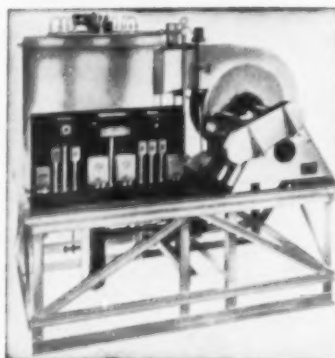


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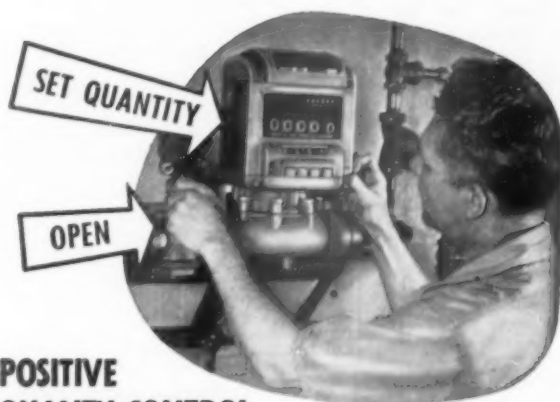
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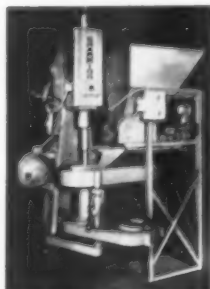
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Efficient, compact, low-investment Champion plants, using local aggregates and local labor, pare production costs to the minimum. Effect tremendous economies in freight, distribution and breakage. Net results: lower costs to consumers, leading to increased sales volumes, and a generous margin of income for the manufacturer.

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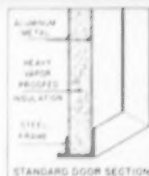
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STANDARD sliding doors need no aisle space. The carrier-type door (shown) requires 13" minimum clearance above top of door opening. A vertical sliding door, counterweighted for easy opening, is also available.



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Fleming 180—W/4"6"8"12" Molds, Saah Halves etc.; 44 Steel Racks, 1400-10" Pallets. This machine is less than 2 years old, has pressure head and all the late features. In excellent condition, can be seen at Radcliff & Berry Concrete Products Co., Orleans, Indiana.

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These Machines are all in very good shape and can be bought with small down payments.

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Koehring 10E Twin Batch Paver on Rubber—Serial 24723. Perfect Condition. Age about 3 years.

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Stearns 27 & 9 Jolteretes ..... \$500.00 each  
(Jolterete owners at this price buy one for spare parts.)  
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1—Truckman Platform Lift—4000 lb. capacity. Excellent Condition ..... 430.00  
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100,000 pressed steel pallets in stock (Send tracing or sample for quotation).

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Send in list of equipment you need. If we don't have it in stock, we usually know where we can find it at a bargain.

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Metal  
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Dunbrick, with steel racks and pallets. Can be seen in operation. Reason for selling, we purchased larger equipment for a new plant. Must move—make us an offer.  
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Presently employed in full control—10 yrs. experience—full knowledge of block machinery & allied equipment—Will relocate anywhere—including foreign with proper opportunity—present salary in 5 figures.

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**LIGHT the TORCH  
OF HOPE**



**HELP YOUR  
HEART FUND**

**DID YOU  
BENEFIT  
FROM  
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'ROCK  
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With 5 Yard Jaeger Mixer. In Like New Condition.

Priced For Quick Sale.

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made by

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### LOWER COST

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Proved to last as long or longer—yet cost considerably less. Write for prices.

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#### Ready Mix Concrete & Block Plant

Located in County Seat. At the edge of a huge irrigation project under development. 1/2 yd drag bucket, 1/2 yd clam bucket, 12"x30" steel silo K.D. 30' portable elevator, 15, 20, 25, HP 220 motors.

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### USED EQUIPMENT FOR IMMEDIATE DELIVERY

1—Used Jaeger 3 yard concrete mixer, mounted on 1960 Ford—Mixer in good mechanical condition. Motor in 1960 Ford only one year old.

Price F. O. B. Petersburg, Ind. \$2750.00

1—Model TM500 Westinghouse truck mixer 5 yard capacity, used only as a demonstrator.

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ONE USED 50' STERNS MIXER OR ITS EQUIVALENT FOR BLOCK MANUFACTURE. PHONE 3471 OR WRITE:

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BOX O-59, CONCRETE PRODUCTS  
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Pallets  
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Lift Trucks  
Block  
Machinery

## WITTEMAN MACHINERY COMPANY

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Elevators  
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### FOR SALE

Complete block plant, capacity 1500 blocks hourly. Complete with all equipment, rolling stock includes 15 trucks and tractor-trailer rigs. 1955 sales over \$450,000. Buildings, 8 acres ground. R/R spur track, all assets included. Located in Ohio city of 50,000. Owners retiring. Priced at \$600,000. Terms 20% down to reliable purchaser.

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4000 8" Equiv. A DAY Excellent condition 8" & 12" attachments with approx. 4000 8" & 2700 12" pallets. Approx. 100 Chase block cars, transfer cars, rail and turntable. Many spare parts for machine included. ALSO a complete drag line with 75 H.P. motor.

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BOX O-50, CONCRETE PRODUCTS

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Get the best for less

\$1850.00 complete—ready to go to work.

Why pay more?

Maddison Block Splitter features the following:

- (1) Hydraulic operation
- (2) All welded steel construction
- (3) Semi-automatic cycle
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- (5) Straight or angle splitting
- (6) Simple installation, just run power to motor
- (7) Minimum upkeep.

Specifications:

Splits blocks to 8" high.  
Widths and lengths up to 24".  
Big 8" hydraulic cylinder, develops up to 40,000 lbs. pressure on blades.  
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1—Miles 8 x 8 x 16" block machine & Tamper complete with Elec. Motors and 1/2 bag rotary mixer. Used for only 5000 Blocks.

No Reasonable Offer Refused.

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These are all too good to sell for junk. Make us an Offer.

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## unbreakable PALLET RINGS

Write for full information

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LICENSES for Manufacture  
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- DEHYDRATED
- PRE-MIXED
- PACKAGED
- CEMENT PRODUCTS

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**HANDI-CRETE, INC.**

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MODEL P-7A 7,000 lbs.  
MODEL P-10A 10,000 lbs.

IT TURNS IN THE MIDDLE—  
TAKES THE CORNERS LIKE A BREEZE

United by  
a joint



Write for  
literature

Erickson has created a revolutionary new idea in platform trucks—it's ARTICULATED—with a joint or pivot between platform and drive wheels. Models P-7A and P-10A are the units for the new and unusual operations, —autoclaves, for instance—where you need utmost maneuverability with heavy duty capacity. With the ARTICULATED design, platform bed can be made up to 10 or 12 feet and still handle heavy, bulky loads with ease. These articulated models are in addition to the veteran Erickson P-5 and P-7 standard models, and built with the same rugged durability.



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POWER LIFT TRUCKS, Inc.

223 St. Anthony Blvd. N. E., Minneapolis 18, Minn.

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## INDEX TO ADVERTISERS IN THE CONCRETE PRODUCTS SECTION OF ROCK PRODUCTS

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**LITH-I-BLOCK'S MODERN FEATURES  
MEAN MORE HIGH QUALITY  
PRODUCTION AT LOWEST COST**

**ROTA-POSED® AGITATION** — Interlocking fingers on three rotating shafts fill mold in a fraction of former time.

**MICRO-JUSTABLE® VIBRATION**—Calibrated weights adjustable to any vibration intensity desired.

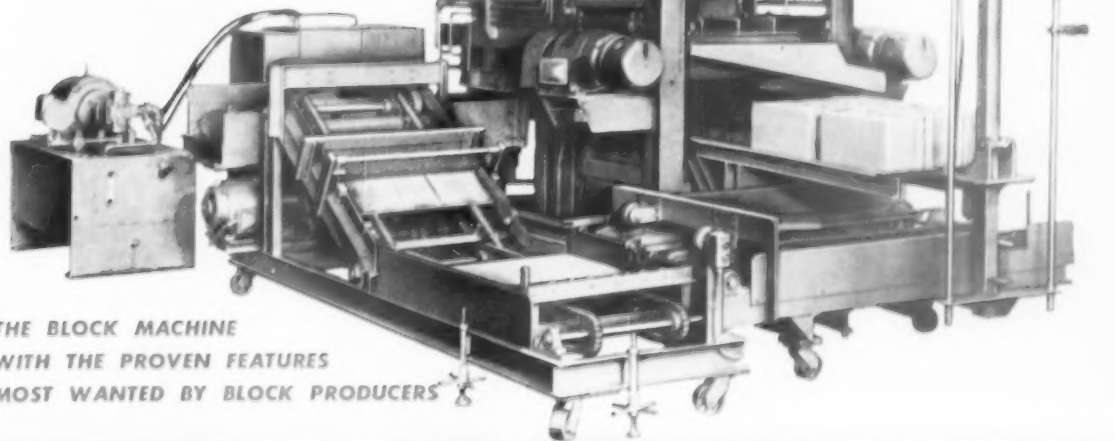
**HYDRAULIC POWER PACKAGE** — 12.5% more power than used with other hydraulic block machines.

**GUIDED PALLET SUPPORT AND STRIPPER** — Extra heavy shafts guide vertical travel for perfect alignment.

**4-POINT HEIGHT CONTROL** — Built-in, positive — on every Lith-I-Block Machine, at no extra cost.

**QUICK CHANGE MOLD BOX** — Change over to another size block in twenty minutes, or less.

**FRONT PALLET RETURN** — One man operation with optional automatic front pallet return, right or left hand models.



**THE BLOCK MACHINE  
WITH THE PROVEN FEATURES  
MOST WANTED BY BLOCK PRODUCERS**

**PICK THE  
LITH-I-BLOCK  
MACHINE  
THAT'S BEST FOR YOU**

**YOUR CHOICE OF  
HYDRAULIC or AIR POWER  
IN EITHER  
2 or 3-BLOCK MODELS**

SALES AND SERVICE THE WORLD OVER  
**LITH-I-BAR COMPANY**  
HOLLAND · MICHIGAN

ONE PIECE OF EQUIPMENT OR A COMPLETE PLANT LAYOUT

LITH-I-BAR CO.

HOLLAND, MICH.

Send me latest bulletins on Lith-I-Block Machine.

NAME \_\_\_\_\_ TITLE \_\_\_\_\_

COMPANY \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY & STATE \_\_\_\_\_

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CONCRETE PRODUCTS, August, 1956  
A Section of ROCK PRODUCTS

309

MR. BLOCK PLANT OWNER...

see

# STEARNS

for complete concrete products plant equipment



The unequalled, ELECTROMEC® block machine.

The finest, direct-drive rollers.

The versatile, Series 50® block machine.

The surest, time-proven principle of block splitting.

If you are interested in the finest, most complete line of concrete products plant equipment . . . look to STEARNS. Engineered to give you MORE and BETTER BLOCKS per dollar, Stearns equipment means longer machine life . . . less down time . . . greater PROFITS for you. Check and compare . . . ASK ANY OWNER . . . and you'll agree that STEARNS offers more! Write today . . . for illustrated folders.



► SKIPLOADERS  
► TURNTABLES  
► PALLET RETURNS  
► OFF-BEARERS



\* Makes up to full 12" high units.  
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## STEARNS

MANUFACTURING COMPANY • INC.

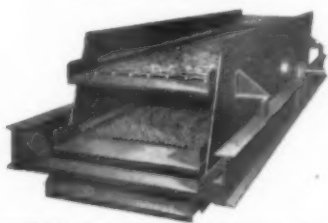
ADRIAN, MICHIGAN • U.S.A.

# WHERE TO BUY

## BONDED EQUIPMENT BARGAINS

IMMEDIATE SHIPMENT FROM OUR FACTORY — WRITE, WIRE OR PHONE

### NEW BONDED® HEAVY DUTY VIBRATING SCREENS



Model Number	Screening Area	No. of Decks	Sale Price
124AS	2' x 4'	1	\$ 443
224AS	2' x 4'	2	472
126AS	2' x 6'	1	472
226AS	2' x 6'	2	501
136AS	3' x 6'	1	581
236AS	3' x 6'	2	688
336AS	3' x 6'	3	956
188AS	3' x 8'	1	475
288AS	3' x 8'	2	815
388AS	3' x 8'	3	996
188BS	3' x 8'	1	1231
288BS	3' x 8'	2	1282
388BS	3' x 8'	3	1375
248BS	4' x 8'	2	1865
348BS	4' x 8'	3	2035
2410BS	4' x 10'	2	1933
3410BS	4' x 10'	3	2305
3412BS	4' x 12'	3	2625

### NEW BONDED® GENERAL DUTY VIBRATING SCREENS



For mineral, chemical and other industrial products. Fast, efficient and economical for cleaning, sizing, grading, dewatering. Made in all metals including stainless steel. Enclosed models for hot materials or dust control. Bonded screens are built for any screening operation, wet or dry. HEAVY DUTY MODELS, TYPE BS: 4-bearing positive throw, eccentric shaft; 3' x 8' to 5' x 14', 1 to 5 decks. GENERAL DUTY SCREENS, TYPE AS: eccentric weight mechanism, spring mounted, 1 to 3 decks, 2' x 4' to 3' x 8'. Write for new 8-page Bulletin 1086 and 1087.

### NEW BONDED® TROUGHING IDLER CONVEYOR BARGAINS

Complete Ready-Fab sections quickly and easily joined together on the job. We take our loss on our stock of short length belting. You can save as much as 50% on the BONDED CONVEYOR SPECIALS listed, with conveyor belting in two pieces. Conveyors are equipped with 5" roll diam. idlers and return rolls, 20" diam. head pulley and 16" diam. tail pulley mounted on 2 1/4" or 2-7/16" diam. shaft. Belt is new 4-ply, 28-oz. duck, 1/4" top rubber cover x 1/32" bottom cover and is fresh stock made by leading manufacturers.

Remember, You Save Up To 50%



CONVEYOR PRICES INCLUDE BELTING

Belt Width	Length of Conveyor	List Price	Sale Price
14"	25'	\$1397	\$ 722
14"	50'	2222	1144
14"	85'	3377	1733
16"	20'	1262	636
16"	45'	2137	1088
16"	60'	2662	1359
16"	90'	3712	1900
18"	25'	1477	794
18"	45'	2217	1166
18"	70'	3142	1648
18"	85'	3697	1933
18"	100'	4252	2220
18"	130'	5362	2797
20"	25'	1517	828
20"	60'	2882	1533
20"	75'	3467	1838
20"	90'	4052	2145
20"	25'	1590	898
24"	45'	2430	1330
24"	70'	3480	1875
24"	100'	4740	2514
24"	120'	5580	2950
24"	150'	6840	3603
30"	50'	2911	1617
30"	70'	3871	2119
30"	90'	4831	2614
36"	25'	1818	1118
36"	45'	2858	1678
36"	60'	3638	2096
36"	100'	5718	3214

If you need a conveyor longer or shorter than any of those listed above, you can find the cost by adding or deducting the following per foot prices, according to belt width, for each foot of completed conveyor, including belting as described above.

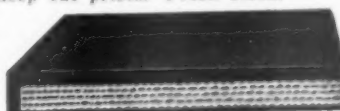
For 14" belt	\$16.84 per foot
For 16" belt	18.04 per foot
For 18" belt	19.24 per foot
For 20" belt	20.37 per foot
For 24" belt	21.78 per foot
For 30" belt	24.75 per foot
For 36" belt	27.95 per foot

Write For Bulletin #1138

### NEW CONVEYOR BELTING

Save Up To 25%

Heavy duty 4-ply, 28 oz. duck, 1/4" top rubber cover by 1/32" bottom cover, 12# to 15# average friction pull, 800# to 1000# average cover tensile strength, tough cotton duck, strong carcass and proper flexibility. For heavy boxes, bags and bulk materials. Troughs easily. Famous brands at deep cut prices. Fresh stock.



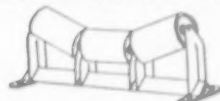
Width	List Price	Sale Price
14"	\$3.43 foot	\$2.75 foot
16"	3.86 foot	2.88 foot
18"	4.27 foot	3.19 foot
20"	4.69 foot	3.69 foot
24"	5.55 foot	4.14 foot
30"	6.77 foot	5.06 foot
36"	8.01 foot	6.00 foot

A high grade of heavy duty 4 and 5-ply, 28 oz. duck, 1/4" top rubber cover x 1/32" bottom rubber cover, 16# to 19# average friction pull, 2500# to 3000# average cover tensile belting, or 24# to 33# average friction pull, 1800# to 2300# average cover tensile belting. These belts are for more severe service, high tonnages and abrasion resistance. For handling stone, mineral ores, concrete, cement, coal, and other similar materials, both wet and dry. Belts have molded rubber edges.

Width	Ply	List Price	Sale Price
16"	4	\$4.59 foot	\$3.36 foot
18"	4	5.09 foot	3.72 foot
20"	4	5.57 foot	4.24 foot
24"	4	6.56 foot	4.80 foot
30"	4	8.05 foot	5.89 foot
24"	5	7.68 foot	5.61 foot

Additional widths and plies available at low prices. Write for Free Sample.

### NEW IDLERS AND RETURN ROLLS 25% BELOW LIST PRICE



3-roll, 5" diameter Troughing Idlers for:

14" belt	\$18.50	24" belt	\$21.25
16" belt	19.25	30" belt	22.00
18" belt	20.50	36" belt	22.75
20" belt	20.75	48" belt	25.50

1-roll, 5" diameter Return Idlers for:

14" belt	\$ 7.25	24" belt	\$ 8.50
16" belt	7.50	30" belt	9.50
18" belt	8.00	36" belt	10.00
20" belt	8.25	48" belt	11.50

All steel. Interchangeable with other well-known makes. Furnished with easily replaceable pre-lubricated sealed ball bearings. Also can be furnished with greaseable type Alemite Fitted bearings at slight additional cost. Maintenance is negligible. Bonded Rubber Disc Impact Idlers Priced from \$61.00.

Write For Bulletin #1138

### BONDED CONVEYOR ACCESSORIES

All Bonded Troughing Idler Conveyors (described in this ad) can be equipped with any accessory described below or use them on your present conveyor or bucket elevator. Write for Bull. #1138.

		
Carrying Belt Guide Idler \$14.50	Return Belt Guide Idler \$11.75	Wing Pulley \$71.50
		
Holdback \$99.00	Self-Aligning Idler \$60.75	
		
Head & Tail \$149.00	Return Roll \$7.25	

YOU ARE WELCOME TO VISIT THE BONDED FACTORY ANY TIME

### BONDED SCALE AND MACHINE COMPANY

PHONE: Hickory 4-2186 Days;  
128 BELLVIEW

WRITE FOR FREE CATALOG AND PRICES

Mfgs. of Scales, Conveyors, Conveyor Parts, Idlers, Vibrating Screens, Crushers and Feeders

PHONE: AXminster 1-2213 Evenings  
COLUMBUS 7, OHIO

ALSO SEE READY-MIXED CONCRETE AND CONCRETE PRODUCTS EQUIPMENT  
WHERE TO BUY ADVERTISING IN CONCRETE PRODUCTS SECTION

# FOR SALE

## DIESEL GENERATING SETS

Following sets are now in operation at Sloan, Clark County, Nevada. May be inspected during daylight hours. All are in first class operating condition and will be replaced by public power service within next 30 days. Prices quoted on request.

1. Fairbanks Morse Model 32E14. 150 H.P. 300 RPM. 100 KW. 220-440 Volt.
2. Fairbanks Morse Model YVA. 120 H.P. 257 RPM. 72 KW. 480 Volt.
3. International UD18. 50 KW. 220-440 Volt.
4. Caterpillar D-4600. 30 KW. 480 Volt.

## POWER UNITS

May also be inspected in operating condition at Sloan, Nevada.

1. Caterpillar Model D-13,000.
2. Caterpillar Model 75.

For further information contact

E. B. LONG

## UNITED STATES LIME PRODUCTS CORP.

2244 Beverly Boulevard  
LOS ANGELES 57, CALIFORNIA  
Dunkirk 5-3271

## KILNS-DRYERS-COOLERS

- 1—8' x 125', 3/4" shell.
- 4—7' x 110', 9/16" shell.
- 1—7'6" x 7' x 125', 1/2" shell.
- 2—6' x 74', 3/4" shell.
- 2—7'5" x 20', 5'2" x 20' Link Belt, Rote-Louvre.
- 1—6' x 40', 3/4" shell.
- 1—6' x 60', 5/16" shell.
- 1—4'6" x 50', 3/4" shell.

## CRUSHERS-PULVERIZERS-MILLS

- 1—Allis Chalmers 10" Superior McCully.
- 1—Allis Chalmers k-9 Gates Gyratory.
- 10—Jaw Crushers 5"x6" to 42"x48".
- 2—Pennsylvania 25XR-100, 100 TPH.
- 3—Hardinge 4 1/2' x 16", 6' x 22", 7' x 36" Ball Mills.
- 3—Patterson 6"x8" Ball Mills.
- 1—Raymond 253 Imp. Mill.
- 1—Dixie 22424 non-clog Hammermill.
- 7—NEW Jeffrey Hammermills 24"x20", 20"x12", 8' x 15".

## SCREENS-SEPARATORS

- 3—Tyler Hammer Screens 4'x7', 4'x8', 3'x10', single and double deck.
- 1—Link Belt 3'x8" double deck screen.
- 5—Rotex 40"x84", 40"x120".
- 1—Air Separator 4'.

## MISCELLANEOUS

- 2—Chicago 14"x7" Compressors, 434 sfm.
- 2—Oliver Rotary Dewaterers 8'x4'.
- 12—Bucket Elevators 20' to 75' centers.
- 250 ft. Link Belt 12" Troughing Conveyor.
- 1—10,500 gpm Centrifugal Pump 135' head.

## Partial List

Your Inquiries Solicited

## BRILL EQUIPMENT COMPANY

2401 Third Ave. New York 51, N.Y.  
or  
4101 San Jacinto St. Houston 4, Texas

## SPECIALS

- 2—New 6 1/2' x 150' Kilns
- 1—6 Williams Jumbo hammermill.
- 1—28" Teismith Intercone Crusher.
- 2—2350 Allis-Chalmers hydrocone crushers.

## KILNS

- 1—4 1/2' x 40'.

## DRYERS

- 1—4 1/2' x 30', 8' x 120'.

## CRUSHERS

- 1—48" x 42", 18" x 36", 12" x 24" Jaw Crushers.
- 2—42" x 16" Allis-Chalmers Crushing Rolls.
- 36" x 16 rebuilt Sturtevant rolls.
- 2—24" x 14" Rogers Iron Works Crushing Rolls. Rebuilt.
- 1—24" x 12" Farrell Bacon Crushing Rolls.
- 1—6", 10", 16", 20" McCully Superior Gyratory Crushers.
- No. 3 up to No. 12 Gyratory Crushers.

## BALL, ROD & TUBE MILLS

- 1—6'x12", 5 1/2'x10" Ball Mills.
- 1—5 1/2'x10" Rod Mills.
- 2—5 1/2'x20", 5'x22" & 6'x22" Tube Mills.

## MISCELLANEOUS

- 1—14" Air Separator.
- 1—6'x4', 12'x10' Oliver Filters.

We make new dryers and kilns.

Have you any machinery that you want to sell?

W. P. HEINEKEN, INC.

30 Broad St., N. Y. Tel. Wh. 4-4236

## SHOVELS-CRANES-DAGLINES

Northwest 6, 1 1/2 yd., dragline-crane, 95' boom.  
H-E 22B 3/4 yd. Shovel-Crane-Backhoe-Drage  
Northwest 30-12 Diesel Shovel 2 1/2 yd. New 1952.  
Lorain L-828 2-yd. Shovel-Drage-Crane 100' hm.  
Buc-Erie 54-B Diesel Shovel, 2 1/2 yd.  
Lorain 402 Crane-Drage, 90' hm. Diesel Swamp Calf.  
Lorain Model MC 254W truckcrane 23 tons cap.  
Bay City 190T61 truck crane 25 tons. Diesel.  
Link-Belt HC90 truck crane 25 tons 90' alloy boom.  
P&H 225A truck crane 20 tons cap. 90' boom.

## LOADERS

Hough Model HM 1 1/2 yd. Pay Loader.  
Hough Model HMD 1 1/2 yd. Diesel.  
Fucild Model 10YB Cummins Diesel.  
Hough TD8 1 yd. bucket (Diesel).

## CRUSHERS-KILNS-DRYERS

JAW: Acme 18x20, 14x20, 18x28, 10x12, 16x32, 18x32, 25x40, Eagle 20x30, Diamond 24x30", Cedar Rapids 10x20, 20x30, 25x40, Farrell 10x20, 18x30, 14x30, 18x30, 36x48, Buchanan Type C 36x42, 40x48, Acme 18x32, Traylor 18x30, 24x30, Allis-Chalmers 30x18, Good Roads 10x30, Teismith 18x32, Traylor 42x18, Allis-Chalmers 42x30.  
GYRATORY: Al-Chal 22", 6", 7 1/2", 8", 9", 10", 19 and 30 Teismith 88", 38" Intercone, Kennedy Van Saun T, 19, 25 1/2"-8, 37 1/2", 38", Traylor TY 1' 8", 1' Type T8.

ROLL: Cedar Rapids 40x20, Pioneer 40x22, Pioneer 30x18, Teismith 24x10, Universal 40x24 double.  
HAMMERMILL: Jeffrey Type B2 24x20, Type B 36x24, 36x30, 36x42, Eagle 24x24, Stedman 24x30, Cedar Rapids 50 50, 30x32.

BALL MILL: K.V.R. Type M 6'x8' Airswept, Marry No. 64 1/2, Hardings conical 10'x48", 10'x36", 6'x22", 6'x12", 5'x7", A-C 6'x16".

TUBE MILLS: 8'x16", 5'x20", 5'x22", 6'x12".  
ROD MILL: Jackson & Church 4'x10" 10 ton rods, new, Marry 3x8, 5x12, 6x12, Ruth 4'x11".

AUTOCLAVES: Jackson & Church bolted head 50'x6" "Quick Acting" head 50'x8".  
CONE: Symons 2' and 3' coarse bowl.

KILNS: Louisville 6'x30", 6'x50", others 4'x48", 7'x100", 10'x100", 8'x10", 6'x30".  
DRYERS: Louisville 6'x30", 6'x50", others 4'x48", 7'x100", 10'x100", 6'x30" complete with motor. NEW.

COMP. MILL: A-C 7'x24" with motor drive.

## CRUSHING PLANTS

Cedar Rapids 2036 Primary 25 H.P. 4M Diesel.  
Pioneer 150 Primary 2026 Cat Diesel.  
Pioneer Secondary 4022 roll Cat. D 13000.  
Cedar-Rapids Pitmaster Portable.  
Pioneer 260W, crushing, washing, screening.  
Cedar Rapids 40x33 Port. Secondary, Diesel.  
Aus-West, 2540 Port. Primary.  
Pioneer Port. 11x36 Jaw, 40x20 rolls.  
Cedar Rapids AA 2225 Primary Port.

## CLASSIFIERS

Conveyco 4'x10" sand-dewatering pump and motor.  
Dorr 5'x20" Rake type.  
Dorr 6'x21" Duplex. Rake type.  
Hardinge 6'x14" counterrotary scrubber.  
Teismith Twin Racer Rewasher 18'x11'3".  
Dorr Type DRFH 20' dia. bowl.

## CONCRETE PLANTS AND EQUIPMENT

Noble CA-245, complete plant, almost new.  
Noble CA-150 5 comp. 150 ton bin.  
Lippert 465 hbl. cement bin complete.  
Mixermobile 2 yd. 45' tower. Extension to 155'.  
C. R. Johnson 492 hbl. bulk cement plant.  
Futter Fluro Model 265 cement pump.  
Johnson concrete plant 300 yds. Corps Engr. Spec.  
5 aggr. comp. cement silo 2700 bbls.  
B-K 400 hbl. cement bin, 400 bbl. silo.  
Noble Model CA-154 Concrete Plant.

## SAND AND GRAVEL HYDRAULIC DREDGES

Morris 16" x 14" Portable, Electric.  
10" Portable Diesel powered. Complete.  
12" Diesel powered, pontoon mounted. Complete.  
Elliot 8" with cutter. Diesel Hull 18'x18'x3'6".  
8" Hydraulic Diesel. On 32'x8" steel pontoons.  
Amco 10" Diesel power portable. Excellent.  
6" portable Diesel complete with cutters, etc.  
8" H. P. twin Diesel drive. Complete.

## DERRICKS

American 30 ton Guy Derrick 100' boom, 116' mast.  
Special 35 ton stiff leg derrick, 100' boom.  
Nat'l Bridge 30 ton Guy Derrick, 100'.  
American 30 ton stiff leg, 100' boom.

## SCREENS

Tyler F 360 4'x12' 2 deck w/apray bars.  
Simplicity 3'x8' 3 deck.  
Acme 5'x24' revol. scalping with motor.  
Acme 5'x24' revol. grading with motor.  
New Holland 4'x12' 4 deck.  
Diamond Model DIW 3 deck 4'x12'.  
Tyler 4'x10' (no deck heavy duty, motor, Gen. Set.  
Teismith 5'x12' dbl. deck elec. motor.  
C. R. 4' x 12' dbl. deck Elec. motor.

## RICHARD P. WALSH CO.

30 Church St. New York, N. Y.  
Cable: RICHWALSH  
Tel: 7-0723

## EVANS & ASSOCIATES CONSULTING ENGINEERS

Box 334

Annaville 1, Pa.

A complete service for the  
lime, crushed stone and  
associated industries.



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190-B Bucyrus Erie Elec. 8 yd. Shovel  
170-B Bucyrus Erie Elec. 6½ yd. Shovel  
1600 P&H Elec. 6 yd. Shovel  
2400 Lima 6 yd. Diesel Shovel  
120-B Bucyrus Erie Elec. 5 yd. Shovel  
1055 P & H 4½ yd. Shovel  
111-M Marion 4 yd. Shovel  
1201 Lima Standard 3½ yd. Shovel  
111-M Marion 3 yd. High Lift Shovel  
1201 Lima High Lift 2½ yd. Shovel  
803 Lima 2½ yard Shovel  
80-D Northwest 2½ yd. Shovel  
955 P&H 2½ yd. High Lift Shovel  
54-B Bucyrus Erie 2½ yd. Shovel  
38-B Bucyrus Erie 1½ yd. Shovel  
6 Northwest 1½ yd. Shovel  
25 Northwest ¾ yd. Shovel  
22-B Bucyrus Erie ¾ yd. Shovel  
9-W Bucyrus Monighan Elec. Drag, 170', 13 yd.  
360-M Marion Drag, 150', 10 yd.  
625 Page diesel drag, 150', 10 yd.  
6160 Bucyrus Monighan Elec. Drag, 160', 8 yd.  
200-W Bucyrus Monighan Drag, 140', 6 yd.  
621 Page diesel Drag, 135', 6 yd.  
2400 Lima Drag, 120', 6 yd.  
5-W Bucyrus Monighan Drag, 120', 5 yd.  
4500 Manitowoc Diesel Drag, 120', 5 yd.  
4-W Bucyrus Monighan Drag, 110', 4½ yd.  
1201 Lima Dragline, 85', 3½ yd.  
1055 P&H Diesel Drag, 100', 3 yd.  
3500 Manitowoc Diesel Drag, 80', 2½ yd.  
802-Lima Cranes  
58-BH Joy Champion Rotary Air Drills  
600 Reich Heavy Truck Mounted Rotary Air Drill  
Failing Rotary Drill  
Quarrymaster Drill—with 2-500 cu. ft. Compressors  
Also, 42-T, 29-T and 27-T Well Drills

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UNIVERSAL 2-Ton Portable Plant with 18x24 r.b. Jaw, apron feeder, underconveyor, power, mounted tandem axle, pneu. tires, front dolly. Secondary portable with 18x24 r.b. Double Roll, 2x8 2-deck screen, rotator, power, delivery conveyors, mounted on tandem, pneu. tires, front dolly. Excellent. \$18,500 Rental Purchase.  
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ROGERS 10x20 r.b. Jaw crusher. \$1250.  
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1 1/2 yd. Sauerman stockline cableway; 1 1/2 yd. Sauerman hoist; Twin City engine; 100' Steel Mast; Rolling Bearing Blocks; 800' Trackline; Steel Tipple & Hopper; 10 x 30 Roller Bearing Crusher; 2 Deck Plate Vibrating Screens; Smith Settling Tanks; 6" water Pump with Chrysler Propane Engine & Tank. Complete gravel plant now in operation.

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6 Extra Draglines & Buckets Haiss Model 75 Rubber Tired Loader

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1948 International K5 Steel Flat-Top Truck, 16' Bed  
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Ross Straddle Truck (Lumber Carrier)  
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5 Torps 18" x 30" 12 oz.—Like New  
3/4 Yd. Insley Concrete Bucket

Large Quantity 4 x 8 Plywood Forms  
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32' c/c 6x4 buckets on 7" belt.  
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24"x20' Jeffrey Hammer Style B, NEW.  
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48" 3-deck SWECD Sifter, NEW.  
Tyler 5 x 12, 3 x 10, Wet type.  
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Gayco 5' x 15", all with motordrives.

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625 CFM Water, Compressor 14x18.  
686 CFM G.D. Compressor 8 1/2"x6.  
150 HP Union W.T. Boilers.  
47' Screw Conveyor 12", 2 HP motor.

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COLLECTOR Cyclone Dust type 10,000 CFM capacity

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SCREEN 4 x 6" Robins Gyrex Dble deck

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Cedarapids 4A 2540 primary unit on rubber.  
Cedarapids 4033 hammermill secondary unit. Rebuilt.  
Cedarapids model BBR 1836 jaw crusher scalping unit. Reconditioned.  
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Cedarapids hammermill. Rebuilt.  
Cedarapids 2033 hammermill. Excellent.  
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McLanahan 12" x 30" log washer with V-belt drive.  
12' x 35' inclined open elevator. New.  
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2 1/2 ton single compartment 8'x12' bin.  
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Special bins to your specifications.  
Conveyors—18"-24"-30"-36". Also belting.  
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60"x48" to 6"x3"

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8 & 42 ton Plymouth Diesel LOCO 36" & std ga.  
1 & 1 1/2 yd. Sauerman CABLEWAYS  
Aggregate handling Equip. w/1000' 24" CONVEYOR  
Also HG 18"x30, 30"x14, 24"x15 & 24"x60  
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MILLS: 24"x32", 48"x18", 58x14, 48x Ball, 6x14  
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30" Superior McCully gyratory, 9'-6" x 12", 6 x 14  
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SPIRAL CLASSIFIERS: 45", 60" and 72", APRON  
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LOCOMOTIVES: Sixteen—125 ton diesel electric,  
45 ton G.E. diesel electric, 20 yd. std. ga. side  
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Special:—Pioneer port. secondary plant, -40x22 rolls, screens, conveyors, etc.  
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These machines reconditioned in our newly built daylight plant. Come see them!  
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40x48 Buchanan Jaw new condition with 48"x16"  
Telesmith Feeder.  
30"x36" Traylor Blake Model M.  
24"x36" Allis Chalmers Worthington, Rebuilt.  
18"x38" Austin West, Top Eoc. with Feeder.  
13x24, 13x30, & 18"x38" Farrel Blake Jaw  
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37 1/2" Kennedy, 550 Volts Connected.  
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15 Ton Diesel 60" Boom Whirley Crane  
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12 Rod Mills 20" x 54", 4" x 14", 5" x 10", & 6" x 12"  
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45 Ball Mills: 34", 3x7", 4x5", 5x8", 5x10", 5x18",  
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Marcy 88.  
29—Hardinge Mills: 10"x48", 8"x18", 8"x36",  
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19—4"x28", 6"x28", 7"x110", 9"x125" & 5"x50".

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3"x36", 4"x30", 5"x25", 6"x50", 10'6"x80".

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410 CFM Inger, Rand 90B—100HP—440V.  
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Ser. No. 22380, with some accessories  
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- Water Pump & Pipe Lines
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Also

18 Ton Winslow Scales, 80W Haiss Load-  
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ROTARY DRYERS & KILNS: 4'6" x 40';  
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ROTARY COOLERS: 104" x 30'; 104" x  
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HARDINGE CONICAL BALL MILL:  
6' D x 22" L.

Patternon 5'x22" BALL TUBE MILL 200  
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1 Model 1945 40"x22" Serial No. 42 207 Pioneer Triple Roll Crusher  
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Well known national manufacturer of building materials has excellent opportunity for graduate engineers with experience in lime manufacturing for an engineering position in its Chicago home office. In replying please state age, education, experience, and salary requirement.

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To buy raw materials for wide-spread plant operations. Technical training; familiar with the use of coal, coke, ore, limestone, dolomite, lime, clay, fluorspar, scrap, refractories, ganister, charcoal, etc. 24 to 32 yrs. old. Be able to initiate and conduct negotiations on contracts. Headquarters in East with minor travelling to using plants and to sources of supply.

**BOX O-60, ROCK PRODUCTS**  
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THOMASVILLE, PENNA.

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**WILL LEASE ON ROYALTY OR SELL A LARGE DEPOSIT OF HIGH CALCIUM CARBONATE LIME-STONE WHICH LIES ALONG B. & O. RAILROAD.**

**ROBERT E. O'NEAL**  
Middletown, Va.

Johnson concrete batching, mixing plants (3). Whirley portal gantry crane, 50-ton, 140' bm. Crushers, jaw and gyratory, large (5). Locomotives, 15 to 100 tons, diesel, gas. Ruffing derricks, 75, 35 and 20 ton. Euclids, 15-22 ton end dump diesels, (3). Rotary kilns, dryers, 7x10, 6x90, 6'x35'. Shovels, cranes, draglines, 1½ to 10 yds. Air compressor, 1200', electric, C.P.T.

**H. Y. SMITH CO.**  
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### FOR SALE

1—Model 7 Northwest Dragline. 1—Euclid Model No. 12 Bottom Dump, 30 K.W. Diesel Generator Sets 220-440 Volt, 3 phase. 1—8" Fairbanks Morse Centrifugal Pump with 50 H.P. Electric Motor. 604 Koehring crane-dragline.

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Gardner Denver Horizontal Air Compressor, two stage, 12½x8x8, Model HAB, s/n 94555, 500 cu. ft./min., 125 pounds pressure, with Louis Allis Squirrel Cage Motor, 100 HP, 440V, s/n 601739. All attachments for operation. Condition Good.

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1—4' Standard Symons Cone Crusher

Complete with electric motor  
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30" Gyratory Crusher  
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FINDLAY, OHIO

### WANTED

Used Jaw Crusher  
SIZE APPROXIMATELY 4 x 6  
GOOD CONDITION  
REFLECTS TO:

**CAROLINA STONE CO.**  
BOX 213, UNION, S.C.

### DRYER WANTED

Cement manufacturer wants one used Rotary Dryer 8' to 10' diameter, 100' to 125' long. Write detail information as to condition, specifications, price and location.

**BOX O-51, ROCK PRODUCTS**  
79 W. Monroe St. Chicago 3, Ill.

### WANTED

Used rotary kilns located east of the Mississippi River.

**BOX O-44, ROCK PRODUCTS**  
79 W. Monroe St. Chicago 3, Ill.

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For Quick Results**



## WHERE TO BUY

### MASTER MECHANIC WANTED

We are looking for a man (30 to 45 yrs. old) capable of assuming charge of mechanical repairs and preventive maintenance on light to medium machinery in \$1 million aggregate plant located Ohio. Cement or sand & gravel plant experience helpful but not essential. Man must be able to organize, plan ahead, handle approximately 8 subordinates and have ability to get things done. Here is a permanent position with a real future. Salary open. In reply give complete information including age, marital status, past employment history and qualifications.

BOX O-55, ROCK PRODUCTS

79 W. Monroe St. Chicago 3, Ill.

**POSITION WANTED**—Italian industrial chemist, specialized in cement, 49 years old, married with two children, in good health, now resident of Argentina, South America; seeks employment in U.S.A.—in a Cement Plant. He is acquainted with the systems F. L. Smith, Lepol, Polysius and Krupp. He has had a vast experience and is very competent in the production of aluminous cement, portlands (natural, artificial and pozolanic) and white cement. He has done essays (not only in the laboratory scale, but also on the actual production) using bituminous schists for producing Hydraulic lime; and has registered his patent. He has also a registered patent for producing white cement with new minerals. He has organized the production of new cement plants and has published technical reports in Italian and Spanish Languages. Salary whatever is prevailing for comparable qualifications. Available for U.S. Immigration upon request. Write: Sergio Vatta, 3301 W. Polk St., Chicago 9, Ill.

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A new industry in Central New York is seeking the service of a Production minded man to take charge of a maintenance department. Such a man should be familiar with conveying machinery and heavy machinery in general and be capable of planning work for and directing a small group of men. This position is as big as any capable man can make it. Salary and age limits open.

BOX O-49, ROCK PRODUCTS

79 W. Monroe St. Chicago 3, Ill.

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Telephone Edison 5-8105

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**WANTED**—Gypsum Production Engineers, Cement Production Engineers, Plant Engineers, Layout Men and Mechanical Engineers for Materials Handling, Equipment Installation and Controls on New Plant designs.

Experienced men conversant with current U.S.A. production processes and machines to work on staff of large, well-known firm of Consulting Engineers in Midwest on new American projects. Must have working knowledge of large plant process and equipment, including wet and dry process cement plants, kettle and kiln gypsum set-ups and board plants. Engineering degree not required, providing experience and know-how satisfactory. Salary commensurate with background and experience. All replies treated confidentially. Give complete personal data, age, education, experience, references and salary required.

BOX O-54, ROCK PRODUCTS

79 W. Monroe St. Chicago 3, Ill.

## WANTED

QUARRY SITE OR DEVELOPED QUARRY PREFERABLY LIMESTONE, VICINITY EASTERN PENNSYLVANIA.

BOX O-53, ROCK PRODUCTS

79 W. Monroe St. Chicago 3, Ill.

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— Block Machines\*  
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— Bodies, Trailer\*  
— Brick Machines and Molds  
— Buckets\*  
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— Bulldozers  
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— Central Mixing Plants  
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— Clutches  
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— Concentrating Tables  
— Concrete Forms  
— Concrete Mixers\*  
— Concrete Mixing Plants  
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— Concrete Waterproofing and Dampproofing  
— Conveyors\*  
— Crushers\*  
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— Draglines  
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— Dump Bodies\*  
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— Special  
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\*Specify type.

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Chicago 3, Ill.

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— Tractor Shovels\*  
— Tractors\*  
— Trailer Dump Bodies  
— Trucks, Bulk Cement  
— Trucks, Industrial  
— Trucks, Mixer Body  
— Trucks, Motor  
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If equipment you are in market for is not listed above, write it in the space below.

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RP-8-60

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**Rotary**  
**COMPRESSORS**



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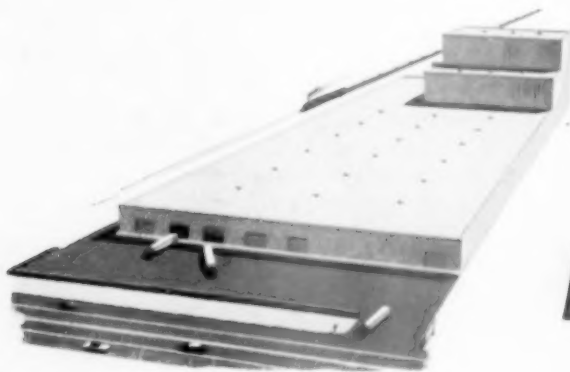
**THE NEW** Kaiser Chemicals refractory plant at Columbiana, Ohio has now begun production of cement kiln refractories.

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